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Engineering News-Record

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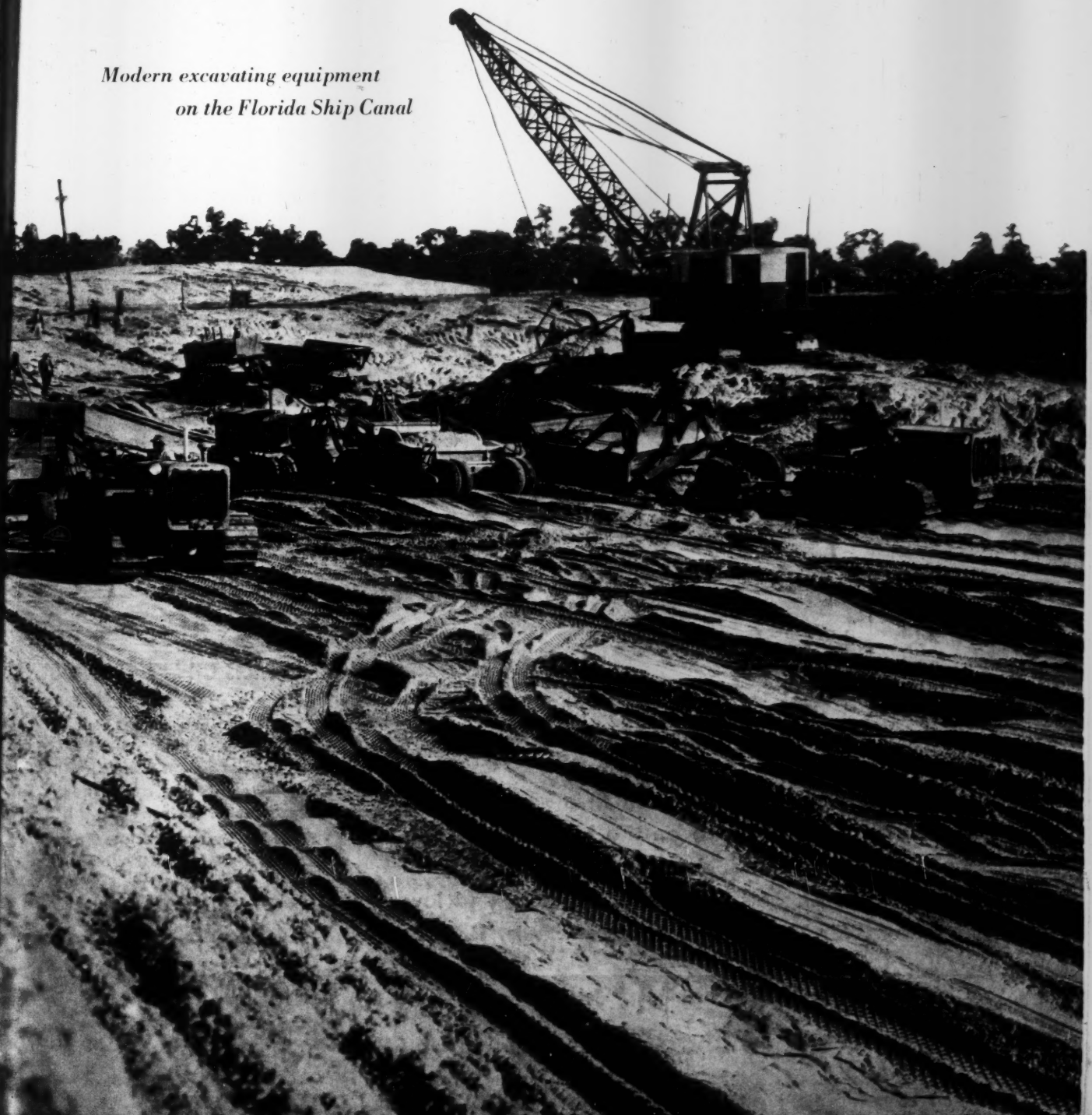
Modern excavating equipment on the Florida Ship Canal



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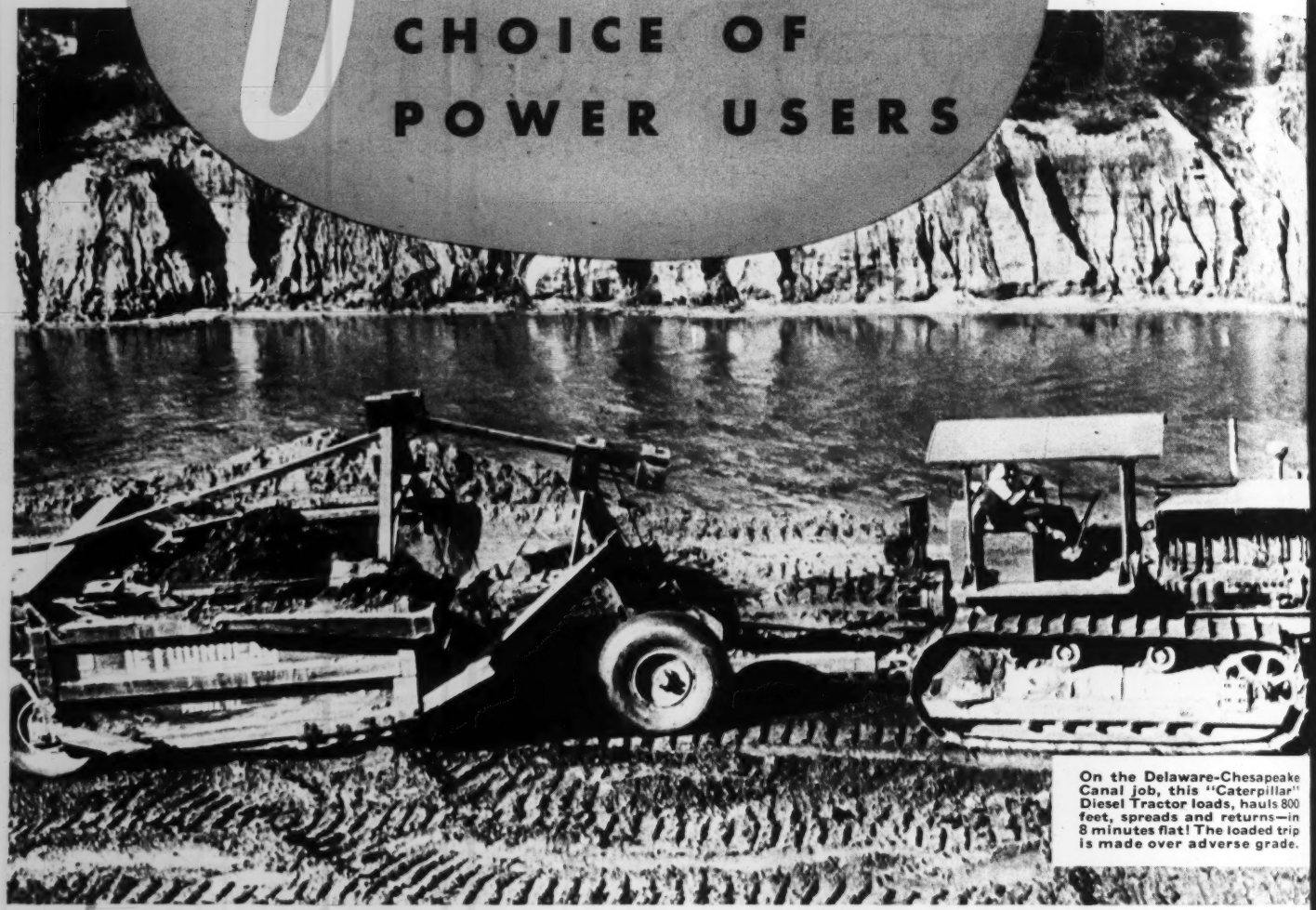

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A MOMENT WITH THE PUBLISHERS

For SAFE Drivers

SOME months ago this page commented on the crusade for greater highway safety and deplored the prevailing vogue of the "horror" propaganda. Since then it has been gratifying to observe the trend away from the notion that we can achieve safer driving by terrorizing the drivers. The apostles of "schrecklichkeit" now have all but disappeared.

With us, however, remains the problem of the driver as one of the three essential elements in any effort for highway safety. Improve the cars as we may, modernize the highways as we should, the dominant figure in the picture still is the individual driver piloting his seventy to hundred-odd horsepower over the public highway. What can be done to make him a more proficient and safer driver?

When the present safety crusade was getting under way this writer expressed wonderment that he never had seen a book on how to drive a motor car. This does not say that none had been published; it merely says that he never had seen one. On the other hand, we have been flooded with textbooks on how to play bridge or shoot better golf. Matrons spend hours in bridge classes learning to manipulate their pasteboards more adroitly; then they step into their cars and drive them home with no more preparation than was required to know how to start and stop, shift gears, pass a "road-test" and to learn that the other fellow usually will get out of the way. In some states even the road test is not required. Likewise, their husbands will spend hours with a golf "pro" learning to knock off a few strokes and then stroll over to the parking area and trundle out their hundred horsepower of potential death and destruction with no more preparation than the inborn confidence of the American male that he just naturally can do anything better than anyone else on earth—except, of course, play golf or bridge, for which study and instruction are required.

WHY is it that we take for granted that anyone naturally commands the exceptional skill and coordination required to drive a motor car? Why are men and women willing to study in order to excel at mere pastimes and leave to chance their skill at so vital an operation? Why is there so little effort seriously to teach driving? Why not classes for children and adults? Why not lessons by qualified instructors in driving for motor cars as well as for golf? Why not books on how to pass in driving as well as when to pass in bridge?

The answer to the last question now is supplied by Ray Sherman, formerly editor of *Motor,* in his book, "If You're Going to Drive Fast." (Thomas Y. Crowell Company.) It deserves thoughtful reading by every motorist. It shows clearly that driving is an art, much of which can be taught by a text to those who really want to learn.

Mr. Sherman disavows any intention to foster unduly fast driving; he does try to set forth the methods and precautions by which driving may be made safer for all concerned at whatever speed. He would help to make us safer drivers, not necessarily slower drivers. Some of his chapter heads indicate his approach: Get a Line on Yourself; Don't Be a Show-Off; Don't Outdrive Your Eyes; Making Time Safely in Town; Good Driving in Bad Weather; Safety in Passing; Curves, Blow-outs, and Brake Failure at High Speeds; An Appeal to Youth: these are just a few, but they are typical.

Such an effort to encourage skill and competence rather than to terrorize the average driver with visions of sudden death appeals to this writer as sane and reasonable. It deserves a tryout. Any driver can learn from this book something that will help to make him a better and safer driver. It is not long; a couple of hours reading will suffice; an occasional rereading should be of great value.

WE must build safer cars; we must build safer highways and rebuild our present highways to higher standards of safety. But, above all, we must develop more skillful and safer drivers; Mr. Sherman's effort is a direct and effective approach to that task.

Willard Chevalier

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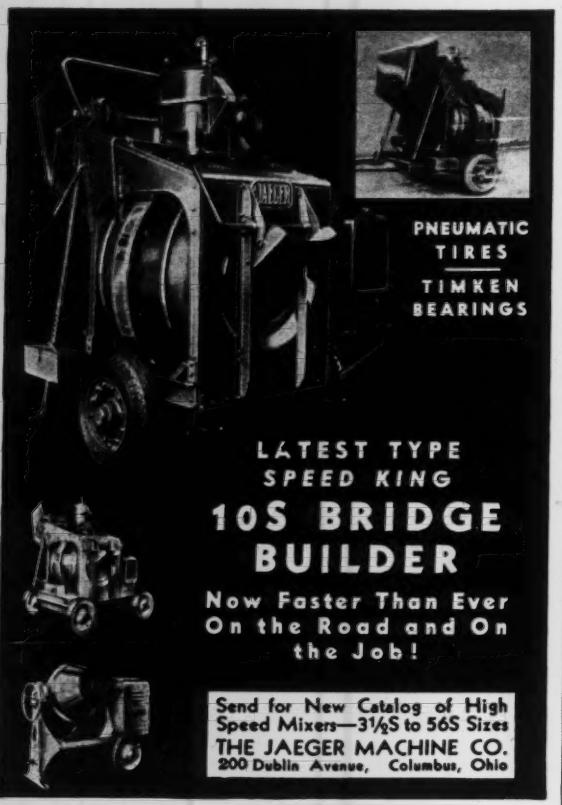

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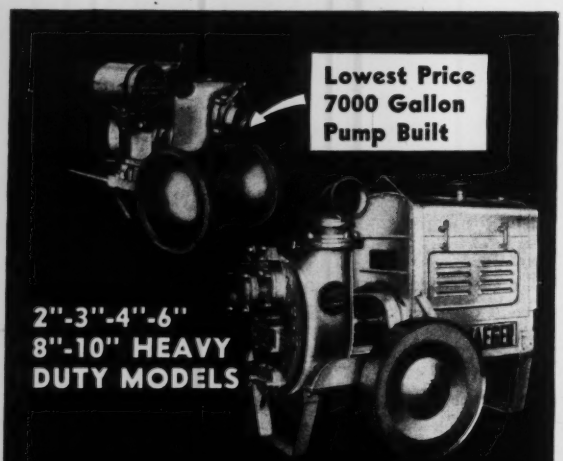

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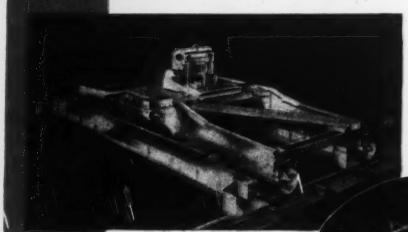

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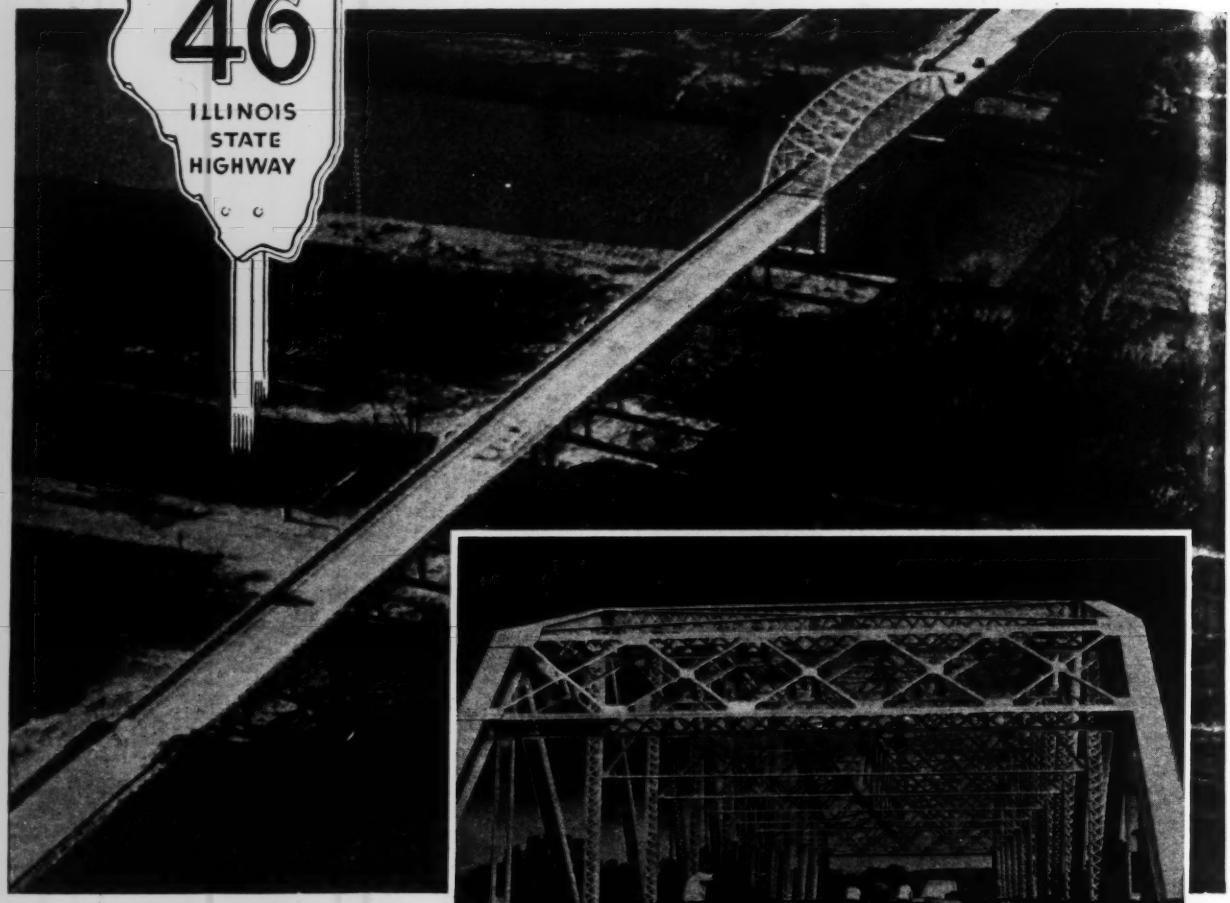
Ancient Moscow claims the finest modern subway in the world constructed at the greatest speed in the most difficult ground. Next week two writers, from first-hand information and personal observation, tell the story of the Moscow subway.

Spans Canal and Railroad



(Above)—Mannheim Road Viaduct built for the State of Illinois, Department of Public Works and Buildings, Division of Highways—Ernest Lieberman, Chief Highway Engineer.

(Above)—The 262 foot through truss span over the Canal has a roadway of asphalt plank supported on a welded steel plate deck; the beam spans have a concrete slab roadway.

A 262 foot truss and 19 deck beam spans carry the 44 foot roadway and 5 foot sidewalk of Route 46 across the Sanitary District Canal and over the Alton Railroad at Justice, Ill. This structure, approximately 1200 feet in length, is typical of others projected by the Illinois Division of Highways in an extensive program of highway improvements throughout the State.

All structural steelwork for this bridge was fabricated by American Bridge Company from rolled steel structural shapes supplied by the Carnegie-Illinois Steel Corporation.

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ENGINEERING NEWS-RECORD

April 2, 1936

FIG. 1—ON WIDE TOP CUTS, long-boom draglines handle earth one to the other across the Florida Canal and onto the spoil bank as they are doing in building the Mississippi levees.

Beginning the Florida Canal

Earth-moving operations on this new waterway, which is four times longer than the Panama Canal and will require twice as much excavation include a wide variety of methods and almost every type of equipment

SOMEWHAT casually last September the federal government put its hand to the construction of a ship canal across Florida. Giving it its full name, the Atlantic-Gulf Ship Canal is nearly four times as long as the Panama Canal and requires the removal of about twice the material. With the incidental work of bridge crossings and control structures for feeder streams, the task of construction disclosed such proportions that its off-hand beginning with an appropriation of one-thirtieth of the estimated cost aroused keen interest. It is possible now to present general information of the earth-moving operation as it is being carried out and as it projects into the future.

A general description of the Atlantic-Gulf Canal, discussing route and dimensions, history, possible commerce and water-supply hazard, was published in *Engineering News-Record*, Sept. 12, 1935, and a more complete report on the water hazard was published in the succeeding issue of Jan. 9, 1936. The present account, therefore, deals only with the physical features bearing directly on construction, for it is as a problem in construction that the Florida Canal has greatest engineering interest. To the constructor in particular the work in progress presents a contrast in earth-moving methods that is rarely witnessed in these days of universal mechanization.

REFUSAL by Congress to authorize money to continue the construction begun last fall of a ship canal across Florida again brings this ambitious undertaking prominently into the news.

Congressional decision returns the canal work to the category of relief works authorized by fiat and financed by funds given to President Roovevelt to relieve unemployment. If the work is to continue beyond the middle of the present year, additional relief-works funds must be granted. This action rests with the President.

In this situation information of the construction in progress and contemplated is of interest; it is presented in the accompanying article prepared from editorial observations on the work. All figures and factual data come from official sources. —Editor.

Quick start made

The initial appropriation for starting the canal was $5,000,000. Of this amount half a million was set aside for clearing the right-of-way, another half a million for bridge foundations and a third half-million for a construction camp (housing, offices, shops), leaving $3,500,000 for excavation. This at present is the over-all amount of canal digging that is under way.

While the construction possible with $5,000,000 was little, it was begun quickly. The appropriation to the Corps of Engineers was made available on Sept. 3, 1935; bids for about 18,000,000 cu.yd. of excavation were asked Sept. 25 and were received Oct. 7; contracts were awarded a month later for about 13,500,000 cu.yd. at a total bid price of $2,915,180, or an average price of about 21.7c. a cubic yard. A month later the government and the contractors' camps

had been completed and construction well started.

Obviously, with only top excavation being undertaken, observation of the work in hand gives little indication of methods or performance when the heavy excavation task begins. Then too engineers and contractors have had to set about the first work under relief-works requirements noted later that hamper normal construction procedure. On the work so far the contract system has been employed except for camp construction, clearing the right-of-way and one small force-account excavation operation. With the development of the major excavation a change to a much more general use of direct labor may reasonably be expected. Logically most of the excavation comes within the classification of dredging, and in this the army engineers are particularly well equipped for direct construction.

Enormous volumes involved

Referring to the location map, Fig. 2, the canal line is along the St. Johns River from the Atlantic to Palatka, some 80 miles, and the canal cut is in the bed of the river. From Palatka the route in general is along the Oklawaha and Withlacoochee Valleys to and into the Gulf; but, as shown by the profile, Fig. 3, at mile 80 the ground rises above sea level to the crest of the divide and then descends to dip under the Gulf at about mile 175; from here the cut is in the bed of the Gulf.

Thus about 105 miles of the canal are deepening in present waters, and 90 miles are artificial waterway. A navigable depth of 30 ft. is planned, with an allowance for overdepth of 3 ft. in rock and 2 ft. in earth; the bottom widths are 250 ft. in artificial channel and 400 ft. in river deepening; and for the Gulf channel, which extends outshore 19½ miles to deep water, the width will be 500 ft. for 16 miles and 1,000 ft. for 3½ miles. For those fond of comparisons it may be noted that from deep water to deep water the Panama Canal is 50½ miles long, and the Florida Canal is 195 miles long.

It is in yardage of excavation, however, that comparative figures become most impressive; at Panama it was 288,000,000 cu.yd., and at Florida it is estimated to be 570,675,000 cu.yd. Of this total of over half a billion yards, 168,690,000 cu.yd. are rock (Ocala limestone) and 401,965,000 cu.yd. are earth. About three-quarters of the yardage is underwater work.

The figures given indicate in general the construction problem and the logical construction plan. The problem is to handle expeditiously and cheaply a volume of excavation exceeding that ever undertaken in a single construction operation. The plan is established by the conditions; some 400,000,000 cu.yd. of the earth and rock to be removed are below water level and logically presume the use of large-capacity floating excavators. Conditions also indicate removal of the excavated material to some distance from the prism, particularly in the river deepening, and this points somewhat directly to hydraulic dredges as the principal excavating equipment. Such dredges are now being designed in the engineer offices on the canal.

Examination of the profile (Fig. 3) indicates in general the character of excavation. In the St. Johns River, except for isolated outcrops of lime rock, the material is tractable for hydraulic dredges. West of Palatka the excavation runs gradually into the soft porous lime rock known familiarly as Ocala limestone with an overburden of soft granular soil. The lime rock will generally require breaking up for economical removal, but the overburden is material easily handled by pumping or by simple dry-excavating equipment. In the Gulf channel the cut is largely in lime rock.

How work is beginning

Starting with a limited fund of $5,000,000 (only $3,500,000 for actual excavation) present construction naturally does not get very deeply into the canal digging. Essentially it consists of a stripping cut on part of the main divide. The work too is carried on under WPA employment regulations with limitations on working hours and vol-

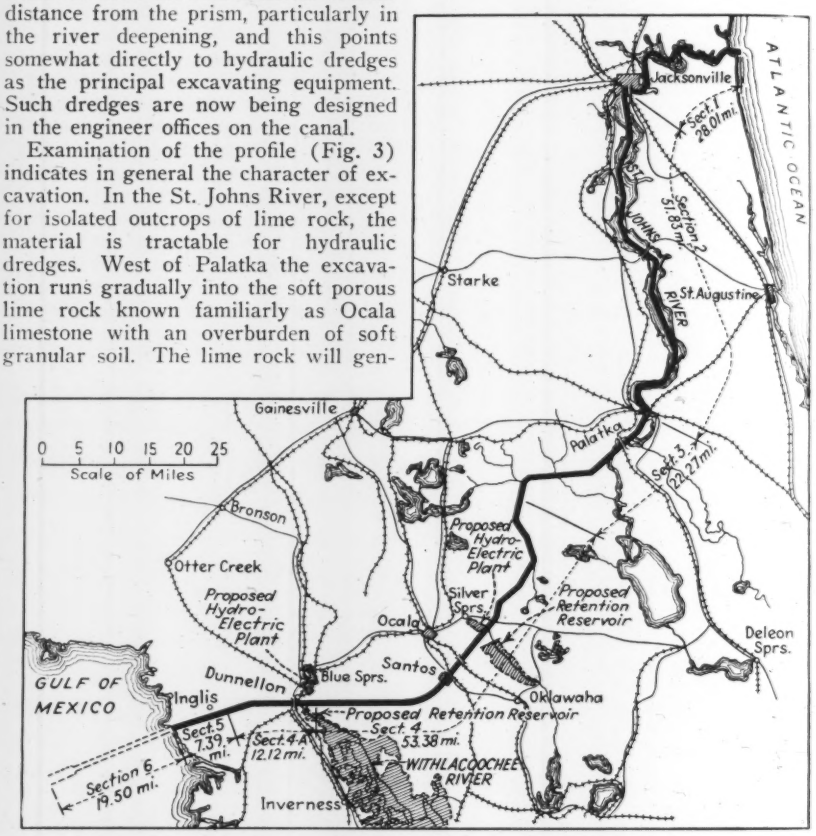


FIG. 2—RIVERS provide most of the alignment of the Florida Canal. Ten railways and highways cross the cut, requiring bridges; where streams are intersected retention reservoirs will be required.

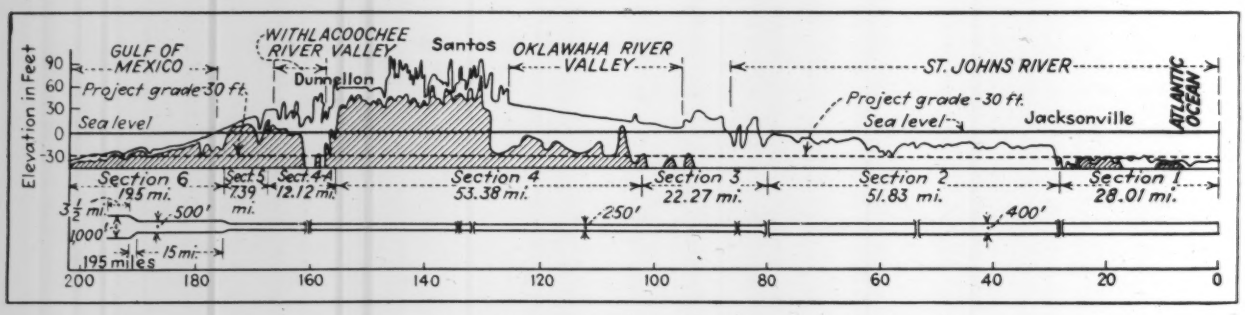


FIG. 3—THE LARGE PROPORTION of excavation below sea level indicates the important part that dredging will play in digging the Florida Canal.

ume of employment per unit of expenditure (one man-year, of not less than 1,500 man-hours, for each $1000 of contract), which also has its influence on methods and equipment. Again pressure existed to get men to work at once, and this affected procedure.

To provide early employment, the government took over the clearing operations; camps were built and battalions of cutters and grubbers were organized. Upland growth consisted largely of pine and scrub oak, while cypress, gum and other heavy timber rendered the swamp clearing difficult; seldom, however, have contractors had a better cleared right-of-way on which to start excavation. The excavation contracts called for a cut the full canal width down generally to El. 55, Fig. 3. This is nominally dry excavation, and it is actually dry except for some ponding in places.

Variety is plainly evident in methods and in equipment, but there is little that is functionally new, as is evident from the accompanying illustrations. These picture about all the types of operations and in themselves tell a fairly complete story of half a century of development in earth moving.

The requirements for employment made it necessary to throw at once large forces into the field and to keep them there throughout the period of the contracts. So with powerful modern excavating machine operations are seen team and scraper gangs and crews loading trucks with shovels. An operation with teams and scrapers is shown by Fig. 4. A truck-loading operation is shown by Fig. 5, and here an inventive contractor introduced a novelty. A row of trestle frames or "horses" on skids was set up on which pan-shaped steel truck bodies were set on rollers. A truck returning from the spoil bank with an empty pan ran through an unoccupied horse, and its pan was lifted and slid off onto the horse; then the truck backed under an occupied horse, and the loaded pan was lifted and slid off onto the truck chassis. So the round proceeded, the shovelers always having empty pans to load and the trucks having no long waits to be loaded. The novel experimental method was not found more efficient than the common methods of loading trucks by hand labor, and was discontinued.

As in Fig. 4, another long-familiar method is shown by Fig. 6—the dinky and dump-car train loaded by a dragline excavator. Incidentally, this type of excavator dominates all digging machines used on the canal, except possibly the tractor-hauled giant wagons and carryall digging scrapers shown by Figs. 7 and 8. Draglines load trucks and tractor-hauled wagons, and the belt conveyor (Fig. 9) and long-boom walking machines handle earth (Fig. 1) one to the other across the wide cut as they did in building levees on the Mississippi River from which some of them came to Florida.

FIG. 4—TEAMS AND SCRAPERS call to mind levee building and railway-grading operations when earth moving relied on muscle and not mechanics.

FIG. 5—HERE a contractor borrows from modern unit-container transport practice to increase the efficiency of shovel-loaded truck haulage.

FIG. 6—ABILITY to compete, shown by a method that opened the Culebra Cut and has done most of the railway grading throughout half a hundred years.

FIG. 7—THE CRAWLER and the pneumatic tire bring together two great improvements in equipment mobility in these tractor-hauled 10-yd. wagon units shown above.

FIG. 8 (RIGHT)—Sublimation of the mule team and two-wheel scraper (Fig. 4) into the modern 12-yd. four-wheel carry-all scraper hauled by a 95-hp. diesel-powered crawler tractor.

FIG. 9—WITH its modern stacker and finer mechanics the belt conveyor is a cultured descendant of one that worked on the Chicago drainage canal 40 years ago.

The two conveyors shown by Figs. 9 and 10 are perhaps the most unusual sights furnished by the contractors' plant, and both have antecedents. The bridge conveyor (Fig. 10) was recently used on levee work in the New Orleans and Memphis districts of the Mississippi River. The tower travels on track and carries the suspended arms, one extending to the cut and the other extending over the spoil bank; a car, loaded by dragline through an automatically-dumped hopper, travels back and forth on the cantilever arms. The belt conveyor for handling excavated material has attained such magnitudes at Grand Coulee that other installations appear small, but as a canal excavating unit it had birth on the Chicago Drainage Canal; anyone who cares to dig back to *Engineering News* of Jan. 22, 1895, will find a picture and description. On the drainage canal the excavated earth was dumped into a brick-yard pulverizer that fed the belt. The installation on the Florida Canal has a strong family resemblance to that on the drainage canal except that the stacker was not used in 1895 and a steam shovel did the digging. Incidentally, the dragline idea had its inception on the Chicago Canal, but it was not until some years later when Page of the original canal engineering staff had developed a practicable dragline bucket that the dragline excavator began to take on its present form.

Returning to the Florida plant, the conveying system is about 800 ft. long, the material being excavated and delivered to the system by two electrically-operated crawler draglines working simultaneously, each equipped with a 50-ft. boom and a 2½-cu.yd. bucket. The spoil conveyor boom is about 85 ft. long. The conveyor system is semi-portable, being mounted on T-rail tracks, permitting it to be moved sidewise with the aid of tractors hitched to the conveyor structure as the excavation work progresses. Half of the width of canal is excavated at first; and the other half is

FIG. 10—TRAVELING TOWER, carrying two opposite booms on which a spoil car shuttles back and forth, was brought from levee building on the Mississippi River.

done on the return trip of the conveyor system.

Fig. 9 presents excellently one of the contrasts of the Florida Canal operations—a row of WPA employees being "given work" piecing out the dragline with hand shovels.

In the carryall-scraper and tractor-wagon work the striking feature is not new processes but greater magnitudes. Wagons holding 12 cu.yd., as shown by Fig. 7, and the 12-yd. and, in one instance, 15-yd. carryalls (Fig. 8) hauled by 95-hp. diesel tractors and making a quarter-of-a-mile round trip in 3 or 4 min. are impressive tools even when working alongside the big walking dragtines and 900-ft. conveyors. Not the least striking thing about these conveyances is the pneumatic-tire wheels on which they are mounted.

But the unusual sight is men—on all sides men chopping, shoveling, trimming slopes, cleaning camps, for the Florida Canal is being built at present with WPA money.

The contractors' forces number about 5,000, and virtually all common labor comes from Florida relief rolls. Common labor is paid 30c. an hour and works six-hour shifts and 36 hours a week; it is housed in dormitories, and meals cost 50c. a day so that the net wage per shift is $1.30. The common-labor turnover was high in the initial stages, due largely to the fact that many of the relief laborers were lacking in physical stamina. Outputs mean little except for overall volumes; since excavation began until March 1 an approximate total of 6,500,000 cu.yd. of material has been moved from the canal prism.

The canal is being constructed under the direction of the Corps of Engineers, U.S.A.; the organization on the canal is as follows: Lieut. Col. Brehon Somervell, district engineer; Captain E. H. Levy, executive officer; Captain J. B. Newman, chief, and Frank Carey, principal engineer, operations division; Colonel Clarence E. Boesch, chief, and Mason Prichard, senior engineer, engineering division; Captain Richard Lee, chief, administrative division; Capt. H. J. Bauton, chief, medical and sanitary division.

Seventy-Year-Old Iron Re-Used in Bridge

INCREASING TRAFFIC recently made it necessary to modernize highway facilities for crossing the Rhine at Koblenz, Germany. An old three-span wrought-iron arch bridge, built in 1862-64 as a double-track railway bridge, had been used for highway purposes exclusively since 1899, one side of the bridge being devoted to a street-car track while the other was used as a vehicle roadway. But as the roadway could accommodate only a single lane of traffic near mid-span, where the upper parts of the arch ribs rose above the floor (to keep down the railway grades), the capacity of the bridge became inadequate. Either complete reconstruction or raising and widening of the old floor were necessary.

Examination of the ironwork of the bridge showed it to be in good condition; heaviest rusting was found near the skewbacks, but this was not serious as there was excess metal at these points. Specimens cut from the iron were tested by Professor H. Kayser at the Darmstadt Technical College; they showed an average tensile strength of 48,500 lb. per sq.in. and an average yield point of 32,000, with elongation of 14.7 per cent. These properties were held to warrant retention of the old structure with only such strengthening as stress conditions might require. The allowable stresses were set at 18,750 lb. per sq.in. under dead and live load and temperature, and 21,500 under combined stress (including secondaries).

Reconstruction of the bridge under these conditions involved building a new deck of adequate width, on a grade line that would carry it to top-chord level at the middle of the bridge. The floorbeams were cantilevered out beyond the outer arches (the old structure consisted of three lattice-braced ribs spaced 20½ ft. apart). The new roadway is 39 ft. wide between curbs and has a 6½-ft. sidewalk on either side; it carries two car tracks set in wood-block pavement on cinder concrete filling on trough flooring; the cinder concrete is surfaced with a 1-in. bedding coat of gravel concrete, on which rests a waterproofing layer of two layers of bitumen-impregnated wool felt with an interposed layer of lead foil; a protective layer of concrete crowned from 1 in. at the curb to 4 in. at the middle of the roadway over the waterproofing carries the block pavement.

The middle arch rib required no reinforcement. Each outer rib received added load from the new deck, however, and therefore was reinforced by adding 50 per cent of the old section in the form of an I-shaped rib placed directly alongside the old box-shaped rib. The added rib was erected by a process similar to that used in erecting the old bridge—namely, by erecting it about 1¾ in. above final position and then lowering the falsework to bearing on the skewbacks, thereby shortening the span of 315 ft. by about 1 in. As the old ribs at this stage of erection carried no load except their own weight, the added rib came down to precisely the same level on release of the central part of the falsework. The operation is described in *Die Bautechnik* of Nov. 15, 1935, by H. von Preschern, of Mainz. Reconstruction was begun in 1933 and was recently completed.

Timber Stiffening Trusses for Suspension Bridge of 345-Ft. Span

Omission of steel rods and use of split-ring connectors for timber in deep Warren truss give unusual rigidity to bridge over Rogue River in Oregon—Design adopted as a U. S. Forest Service standard

By Wm. D. Smith and Rudolph K. Krausse
Assoc. Structural Engineer and Bridge Foreman, Respectively U. S. Forest Service, Portland, Ore.

A HIGHWAY suspension bridge completed recently over the Rogue River in the Siskiyou National Forest, Ore., has a stiffening truss of creosoted timber designed for a high degree of rigidity in a span of 344 ft. 8 in. This is believed to be a record span for an all-timber stiffening truss. The truss is of the Warren type; split-ring connectors are used, so that the joints are equipped to transmit effectively either tension or compression to all-timber members. It was believed that the unskilled CCC labor which it was necessary to use exclusively could be trained for timber erection better than for steel erection, particularly in a location where the hazard was high. All construction and erection work was done by CCC boys whose average age was eighteen years. Altogether, about 150 different young men who had no previous construction experience worked on the job; the average crew was fifteen. There were no serious accidents.

FIG. 1—ERECTION VIEW while stiffener trusses were in process of assembly.

The bridge is located near the mouth of Grave Creek, about 25 miles northwest of Grants Pass, Ore. The source of the Rogue River is in the Cascade Mountains near Crater Lake, and a great part of the drainage area has steep rocky slopes with a heavy winter precipitation. In the spring, heavy rains and melting snow cause sudden floods. At the bridge site, which is in a narrow canyon with precipitous rock walls, the river has been known to rise as much as 60 ft. in 24 hours. The site selected was at the narrowest point of the canyon where one side consists of a steep rock promontory. This point also controls the road location; to avoid excessive road construction costs, it was necessary to fix the grade about 80 ft. above low water, somewhat higher than necessary to clear the high-water mark.

Comparative cost studies of truss spans and a single suspension span showed the latter to be most economical. A single truss span of approximately 350 ft. clear was not considered feasible in timber, and multiple spans would have required expensive high concrete piers.

Suspension-span design

The design adopted called for a steel-cable suspension bridge with a 14-ft. roadway, towers and stiffening truss of timber, piers and anchorages of concrete. The design is for standard H-15 live loading. The cable has a sag of 34½ ft., and the backstays are unloaded. The stiffening truss is two-hinged with a camber of 2½ ft. at the span center. The towers are essentially the rocker type; no provision is made to fix them at the tops of the piers. The floor system consists of 10x20-in. floorbeams attached to the suspenders; an 8-in. laminated timber deck spans between floorbeams. At the center of the span an 8x10-in. distributor beam is bolted to the laminated deck to distribute concentrated loads over the roadway width. It also supports the kneebraces, which stay the top chord of the stiffening truss laterally. The stiffening trusses are bolted with two 1-in. bolts directly to the floorbeams.

Three rods, each 3 in. in diameter and upset to 3¾ in. in the threads, take the load from the main cables into the anchorages. These rods vary in length from 30 to 35 ft. and are concreted in tunnels driven into the rock on the slope of the backstays. The ends of the tunnels were enlarged to provide an anchor block, and the load on the rods was distributed to this block through a double-channel distributing girder. At the cable end the rods terminate in a cast-steel cross-head, semi-cylindrical in shape, grooved to take the 3¼-in. U-bolts that pass through the cable sockets. Provision was made for about 18 in. of adjustment in the length of the backstays.

Each main cable consists of two 7/19 wire ropes 2½ in. in diameter, made up of double galvanized steel wire, which has a minimum tensile strength of 220,000 lb. per sq.in. The cables were prestressed at the factory, using a load equal to the stress produced by combined live and dead loads.

After prestressing, the load was decreased to the dead-load stress, and under this stress the cables were measured for final socketing, and locations of the saddles and suspender clamps were marked. In the final position the two cables lie parallel 5 in. apart. The prestressing increased the modulus of elasticity from approximately 11,000,000 to 22,000,000 and simplified erection by eliminating adjustment of the cable to allow for permanent set under load.

With the cables set to their marks in the saddles, the only adjustment made was to allow for straightening of the backstays as dead load was applied. This was done by leaning the towers toward the anchorages before the span was loaded. Then when the backstays were straightened out under load the towers were pulled up plumb. As the permanent stretch of the cables had been obtained by prestressing, the dead load alone brought them to the sag provided for in the designed camber of the stiffening truss.

Suspenders are steel loop rods 1⅛ in. in diameter, upset to 1½ in. at the top threads. These rods pass through the cable clamps with two nuts on the top to provide bearing on the clamps and adjustment of the suspender length. The clamps are split steel castings; the top

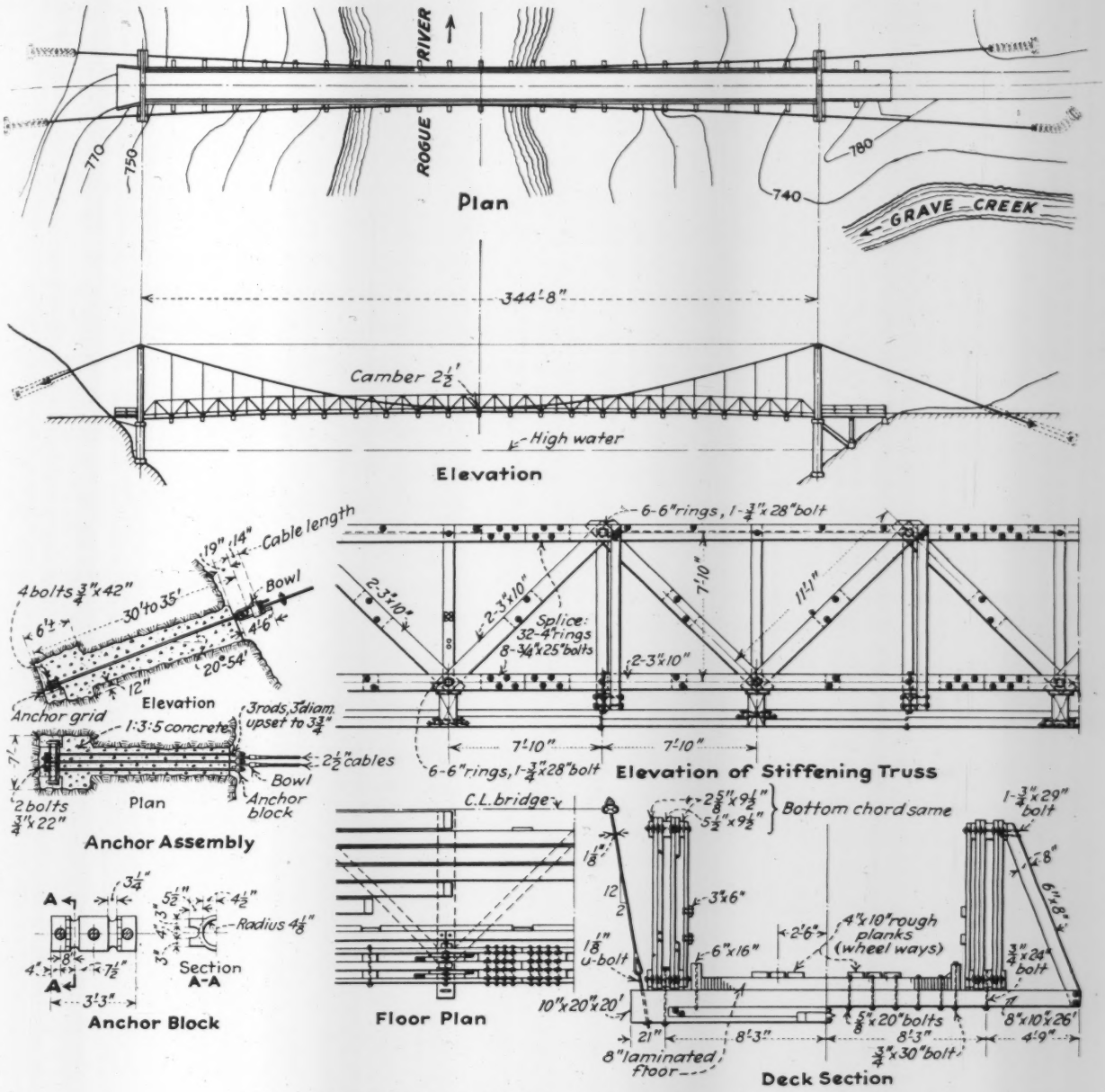


FIG. 2—PLAN AND ELEVATION of highway bridge over Rogue River, Ore., with timber stiffening truss and anchorage details.

half forms a bridge between the ropes of the cable, and the lower half is fastened to the top with 1¼-in. bolts, well tightened to grip the cable. Suspenders have a slope of 1 in 6 to transfer some of the lateral load to the cables. Saddles are of cast steel and are provided with a clamp to prevent slipping of the cable over the saddles.

Timber towers and trusses

The towers, which are 40 ft. high, consist of a double A-frame under each saddle with diagonal and horizontal swaybracing. A-frame legs are 12- and 18-in. timbers with a spread of 11 ft. 2 in. at the base; the bracing is all 4x10 in. Sash brace is doubled, and diagonal braces are single on opposite sides of the tower. The top horizontal member consists of two pieces of 6x12s with a 4x18-in. filler flush with the top of the member. This provides a walkway across the tower between saddles. These towers were shop-fabricated and were framed and assembled in the shop before bolt holes were bored. The tower was then matchmarked for erection.

The towers rest on reinforced-concrete piers consisting of a five-post concrete bent, each post 28 in. square, capped with a 34x42-in. concrete beam. The cap or cross-beam is tied back to a concrete footing in the side hill by two diagonal concrete braces, each 2 ft. square. The piers were designed with a minimum of concrete because concrete materials had to be hauled a long distance.

Stiffening truss

The stiffening truss was designed by the approximate method. The depth of the truss was fixed at 7 ft. 10 in., center to center of chords, which is also the panel length, giving a length-to-depth ratio of about 44. This is somewhat smaller than usual practice in steel and results in a very stiff truss, a desirable point in timber design. Previous experience with timber stiffening trusses has not been satisfactory because of lack of rigidity in the truss. Where a timber truss is subject to stress reversal

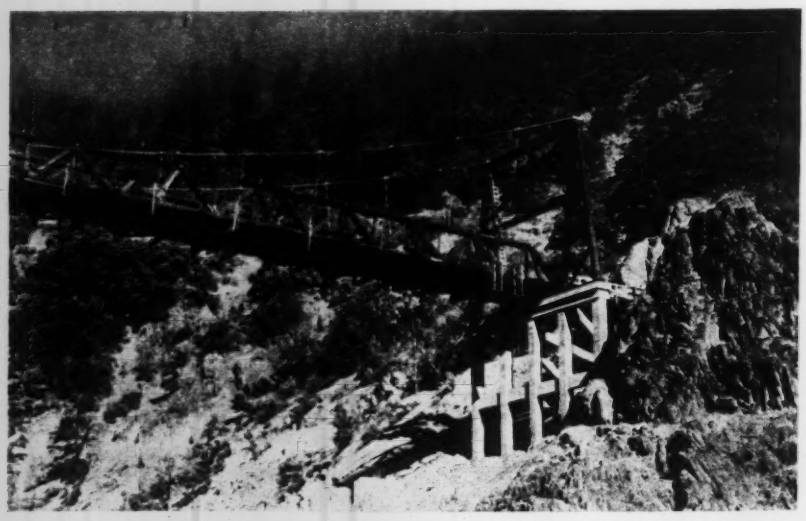


FIG. 3—PIER and tower construction on the rock promontory.

in all members, the customary design is to use counter-diagonals of timber in all truss panels with steel rods for verticals. However, shrinkage in the chord sticks and vibration under load have loosened the joints in such trusses. If a truss is too shallow, deflections are increased, and the rack on the joints soon destroys the value of the truss, leaving essentially an unstiffened cable.

This has been the experience until about three years ago, when replacement of an old stiffening truss on a 240-ft. suspension span made it possible to design a deeper truss and, by putting in split-ring connections, to eliminate the steel tension rods and counters of the usual Warren truss. The split-ring connectors made it possible to use timber efficiently in both tension and compression and, therefore, in members subject to stress reversals. In this way all the usual steel tension rods and half the timber diagonals were eliminated.

This type of stiffening truss has been found so satisfactory that it has been adopted as standard for Region 6 of the Forest Service, comprising Oregon and Washington. The Rogue River Bridge, whose stiffening truss has 44 panels 7 ft. 10 in. long, is an example of this.

For simplicity in shop fabrication and erection, chord sections and diagonals in the Rogue River truss were made uniform throughout. The chords consist of two side pieces of 3x10 and one 6x10-in. center piece. The diagonals are uniformly two pieces of 3x10. Except at the end posts and erection splices, all diagonals have the same shop detail and therefore are interchangeable. Diagonals are packed between the center and side pieces of the chords, and the stress is transferred through 6-in. split rings between all members at each intersection.

Chord splices consist of two pieces of 6x10 packed between the chord leaves; the stress is transferred through 4-in. split rings. Diagonal splices are one-piece 10x12s between diagonal sticks with 4-in. split rings as the connectors.

By putting all splices between sticks, a flush outside surface was obtained, which adds materially to the appearance. The truss was spliced every third panel in both chords and diagonals for erection purposes. Each truss section of three panels was assembled lying on its side and then erected as a unit; the splices were assembled in the erected position.

Erection procedure

All erection was done by means of a "high line," which consisted of a $\frac{7}{8}$-in. wire rope with carriage and fall block. A double-drum hoist unit on a "30" Caterpillar supplied the power for the $\frac{5}{8}$-in. hoist line and $\frac{1}{2}$-in. haul line. The high line was 600 ft. between anchors, had a sag of 16 ft. unloaded and hung about 35 ft. above the bridge deck. This line was used for erecting everything except the main cables.

The concrete plant was set up on the east approach of the bridge, and all concrete was poured for both piers from this set-up; concrete for the west pier was transported by the high line.

The tower on the west side was assembled in an inclined position against a rock face and pulled into vertical position. On the east side the tower was assembled flat on the deck of the approach and raised to vertical position.

For erecting the main cables a tight line was strung outside the towers. The cables were paid out on this tight line, and the ends were fastened to the anchorages. The cables were then lifted into the saddles by a block and tackle from a gallows frame on top of the towers. After placing, the cables were adjusted to their saddle marks and for lean of tower as previously mentioned.

For placing cable clamps, suspenders and floorbeams, an erection bridge was slung between the main cables. This bridge was moved from point to point by the high line and fastened to the main cables while clamps, suspenders and floorbeams were placed. After the cable clamps were bolted in place, the suspenders were attached to the floorbeams to form an assembly that could be hoisted to position as a unit. The suspenders were guided through the cable clamps. Following the floorbeam's erection, the lower laterals, floor system and stiffening trusses were placed.

All timber was Douglas fir, treated

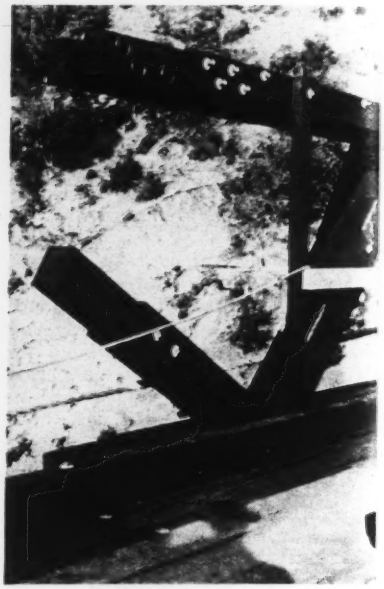


FIG. 4—ASSEMBLY DETAIL, showing connector-ring splice in stiffener truss.

by the empty cell process with a 50-50 mixture of creosote and petroleum. Full shop details were made in a manner similar to structural-steel shop practice. Before treating, the various members were framed and bored. With this protection it is expected that the bridge will have a life of at least 45 years. All hardware was galvanized, and two coats of aluminum paint were applied to it after erection. The trusses were not shop-assembled, the intention being to have pieces of the same detail interchangeable to avoid as far as possible any mistakes in field assembly. No trouble was experienced in erection; it was unnecessary to ream out any of the bolt holes, or to bore new holes in the field. The completed bridge is very stiff; a test load consisting of a tractor weighing 27,600 lb. caused a deflection of only $2\frac{1}{2}$ in. at the center of the span.

The quantities of materials used in the bridge were as follows:

Concrete in anchors and piers, cu.yd.	260
Hanger rods, anchor rods, etc., lb...	26,000
Steel cables and bridge bowls, lb...	23,600
Creosoted timber, f.b.m.	106,000
Galvanized bolts, washers, etc., lb...	12,700

The timber was fabricated and treated by the creosoting department of the Charles R. McCormick Lumber Co. at their St. Helens, Ore., plant. Cable was furnished by J. A. Roebling's Sons Co.

The authors wish to give full credit to the CCC boys who erected the structure. Their pride in the work and their faithfulness during its uninteresting phases were worthy of constant commendation.

R. W. Lincoln, associate structural engineer, U. S. Forest Service, Region 6, designed the bridge. Construction was supervised by the writers as engineer and foreman in direct charge, respectively.

Control of Micro-Organisms in the Albany Water Supply

CONTROL of micro-organisms has been the chief trouble in the operation of the storage reservoirs and filters of Albany, N. Y., since the introduction of the gravity water supply in 1932. Such control is necessary if tastes and odors, length of filter runs and operating costs are to be kept down. Experience shows that algæ control must extend also to the distributing reservoirs receiving the water after treatment.

At the 13-billion gallon Alcove impounding reservoir some of the troublesome organisms can be kept in hand by drawing water from a level relatively free from the organisms, but this does not eliminate all the trouble makers. Moreover, the degree of dependence that may come from using one or another of the four outlet gates, some 14½ ft. apart vertically, is sometimes adversely affected by the elevation of the water in the reservoir and sometimes by the manganese content in the bottom water of the reservoir.

Thus, in June and July, 1935, to escape high algæ counts in the water near the surface, the lowest outlet was used. Thereafter the algæ counts ran as low as 105 standard units per c.c., and the temperature entering the mains averaged only 58 deg. F. for June and July. But on Aug. 13 the manganese content of the bottom water rose so high that a shift to top water was necessary. Thereupon the temperature of the water in the city rose to 77 deg. F. This led to complaints from consumers, particularly those using water to cool air-conditioning apparatus.

In order to avoid such complications, experiments have been made which may make it desirable to change the coagulant from sulphate of alumina to an iron salt. It has been shown that 1.2 grains per gallon of ferrous sulphate and 0.7 grains of calcium hydrate will reduce the manganese more than 60 per cent and give an effluent with a color of 12 p.p.m.

The proper use of copper sulphate, says George E. Willcomb, supervising chemist of the Albany waterworks, in his report for the year ending Sept. 30, 1935, is a major factor in determining the length of the filter runs. With algæ kept below 200 standard units per c.c., the water may readily be so coagulated that 28- to 65-hour runs are attained. The question has been where best to apply the agent. The answer, based on three years' experience is, periodically, to apply it to the water in the reservoir at times of special need, and continuously to the water leaving the reservoir in the crystal and solution form respectively.

Continuous application at the head of the 10-mile conduit leading to the filters has controlled chlorphyceæ and cyanophyceæ but has little effect on diatoms during the 5-hour run to the filters. This is particularly true of Melisora; for whether dead or alive the cells of these diatoms sometimes reach the filters in such volume that they clog the filters and shorten the runs. At best, copper sulphate applied to the water leaving the reservoir reduces Melisora by only 50 per cent. Consequently control of diatoms is concentrated in the body of the reservoir, in the early spring and again in the late fall, just before ice forms.

As these organisms exist in the reservoir from top to bottom, the entire depth must be treated. During 1934-35 this was done once, but only in the water adjacent to the gatehouse. On May 9, 1935, while the water leaving the Alcove reservoir was receiving copper sulphate at the rate of 0.42 p.p.m., Melisora in the filter influent became excessive and the filter runs were reduced to six hours. The next day the billion-gallon prism of water nearest the dam was treated with 3,600 lb. of copper sulphate, or 0.5 p.p.m. Within a week after this treatment the filter runs were normal.

To operate this method of treatment, the reservoir has been plotted and profiled in four zones, and the volume of each per foot of depth computed. This makes it possible to put the proper amount of copper sulphate for a given zone into bags and transport it in an outboard motor boat to a strategic point and transfer it to the speedboat used to distribute the chemical.

Unusual trouble with Synura at the Alcove reservoir and with Oscillaria at the Loudonville distributing reservoir occurred during 1934-5. The protozoa at Alcove suddenly gave rise to cucumber-brassy tastes in December, 1934. Customers' complaints began on Dec. 15, a week before the microscope detected Synura at the filter plant. "This organism," says Willcomb in his report, "is comparatively rare, is derived from swamp water, grows only in cold water, and is of a very delicate structure, so that on breaking up of the cell contents an essential oil is liberated that is soluble in water and imparts to it the taste of a ripe cucumber followed by a dry brassy taste in the throat of one drinking the water." On Dec. 22 the Synura numbered 110 standard units per c.c. Because of freezing weather no copper sulphate solution was being added to the water leaving the reservoir, and as the reservoir was covered with ice no dry copper sulphate could be applied to the water. Immediately the solution boxes were enclosed by a warming chamber, and the solution was applied, "reducing the concentration of odor about 50 per cent."

Activated carbon to control tastes and odors was applied to the aerator effluent as soon as the trouble began but was not wholly efficacious. After many experiments it was found that the best method of application was through divided entrances to the water as it left the coagulation basins. By Feb. 13 with the use of 0.25 grains per gallon of activated carbon, the trouble was completely controlled. On Jan. 29 the mischief-making organism was found at all depths of the reservoir.

Oscillaria in a 75-mg. unit of the Loudonville distributing reservoir caused complaints of musty odors in the city on Feb. 3, 1935. A heavy mat of Oscillaria and soot was found on the side slopes and bottom of the basin, 20 ft. below the water surface. As neither drawing off part of the water from the reservoir nor heavy chlorination proved successful, the organisms were killed by copper sulphate, shoveled from boats onto the slopes of the basin. A year's trial of this method of treatment for all three basins of the Loudonville reservoir is being made.

Aluminum-Coated Steel Developed for Construction

A process perfected by Prof. Colin G. Fink, head of the division of electrochemistry, Columbia University, for coating steel with aluminum, is held to offer great possibilities in many branches of construction. Steel in the form of sheets, shapes or wire that is so treated combines the high corrosion resistance of aluminum with the tensile strength of steel. The material is fireproof, and it may be colored. The process involves saturating the surface of the steel with hot hydrogen gas before dipping it into a molten aluminum bath. A perfect bond between the steel base and the aluminum coat is said to result from this treatment.

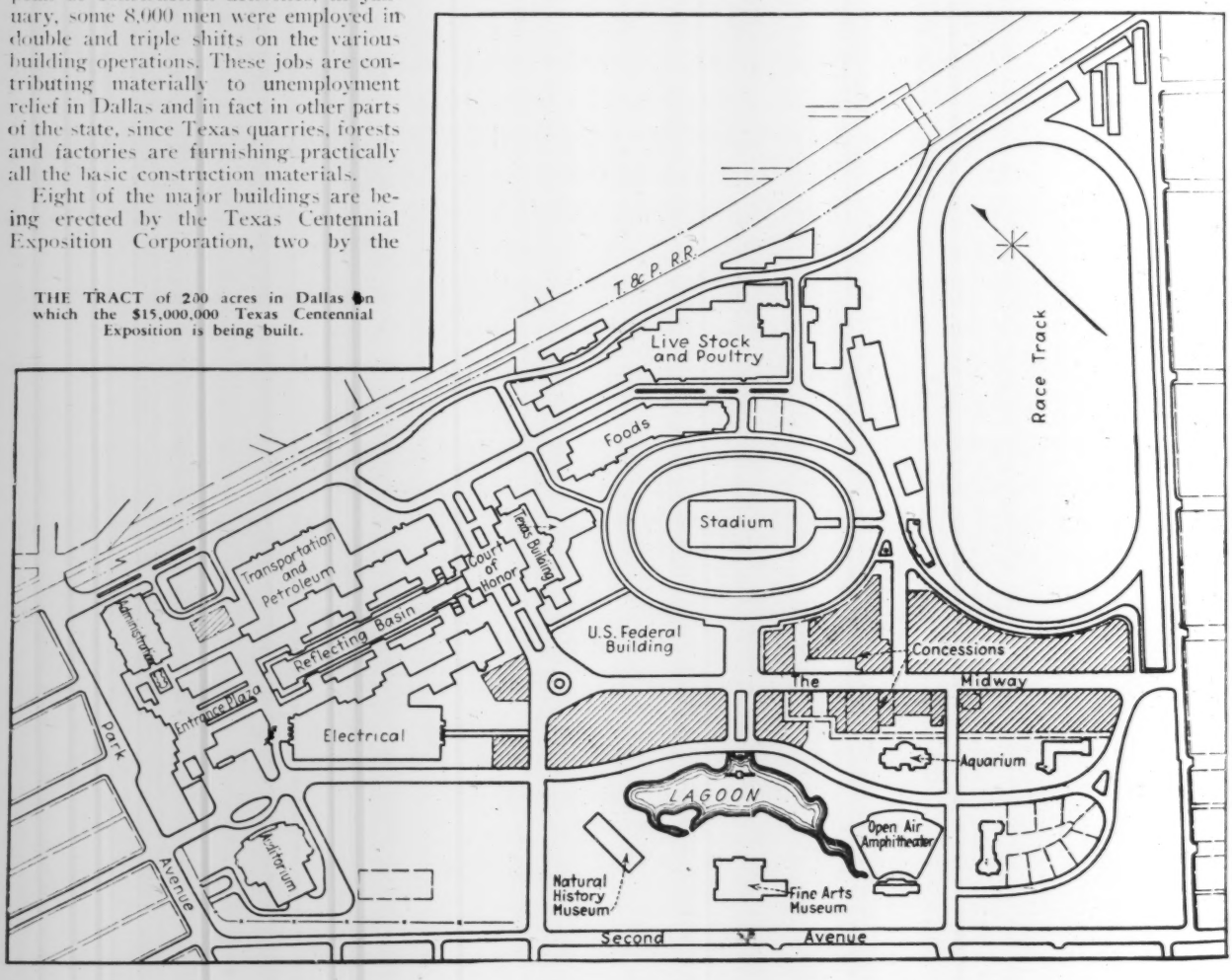
Texas Rushes Its Centennial Construction

Exposition to open June 6 will be housed in 50 structures either entirely new or extensively remodeled from old state fair buildings—Foundation conditions not of the best—Mechanical ventilation provided for summer conditions

THE largest single construction program ever undertaken in Texas is now in progress in Dallas, where more than two-score buildings are being built or remodeled to house the Texas Centennial Exposition, celebrating the state's 100 years of independence. Following nearly a year's work in designing and preparing specifications, a construction schedule was worked out requiring a $40,000 daily expenditure, to assure completion of all the structures in time for the fair to open on June 6. About $8,000,000 will have been expended on the buildings when the program is completed. At the peak of construction activities, in January, some 8,000 men were employed in double and triple shifts on the various building operations. These jobs are contributing materially to unemployment relief in Dallas and in fact in other parts of the state, since Texas quarries, forests and factories are furnishing practically all the basic construction materials.

Eight of the major buildings are being erected by the Texas Centennial Exposition Corporation, two by the United States and one by the state of Texas. The others of the permanent group, which numbers 21 buildings, are being built by the city of Dallas. In addition, eight nationally known firms will put up major exhibit buildings, and a score of smaller structures have been contracted for. The estimated investment in the fair is $15,000,000. The Texas and federal buildings account for $1,000,000 each. Bonds sold by the Centennial Corp. provided $2,500,000, while city of Dallas park bonds and art museum bonds supplied $3,000,000 and $500,000, respectively. The remainder of the cost is largely accounted for by the existing stadium, racetrack, auditorium and other buildings.

Some of the more interesting engineering factors involved in the exposition are as follows: Of the 50 buildings, 21 are of permanent or semi-permanent construction, as the existing state fair grounds and buildings are being utilized and the buildings will remain for state fair use. Except for the auditorium, however, most of the existing buildings are being rebuilt to such an extent that they will be practically new. Foundation problems are difficult, and careful bearing tests were necessary. Mechanical ventilation is to be provided. Light-



THE TRACT of 200 acres in Dallas on which the $15,000,000 Texas Centennial Exposition is being built.

ing is to be of the concealed type, and a large amount of floodlighting will be used for display and decoration. Utility services of permanent nature are being installed, including water lines, sewers and storm drainage, fire alarms, telephones, a public address system, gas service, paving and landscaping.

The main exhibit buildings rest on spot footings, with concrete piers spaced 12 to 25 ft. on centers and connected by tie beams at the ground line, to carry the wall loads. Steel framing is generally used and carries bar joists and metal roof decks covered with insulation and roofing paper. The walls are of hollow tile, stuccoed on the outside and painted; some concrete tile obtained from wrecked buildings is being used as available.

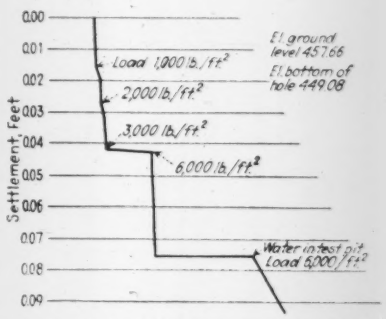
Foundations

In the preparation of the plans a great amount of thought and study was given to the type of foundations to be used, as the ground on which the exposition park is located has long been noted for its treacherous condition. The upper 8 to 10 ft. of soil is known locally as black waxy, a gumbo clay. The soil shows an exceptionally large range of volume change with varying moisture content. Below this layer is a yellow clay 16 ft. deep; although full of air voids and subject to volume change, this material has a much lower expansion coefficient than the gumbo and makes a fairly good foundation support. Underlying the clay is a dry fine sand. Borings were taken through the sand to a depth of 63 ft. without any further type of soil being encountered. The water table was found to be 35 ft. below ground level.

To determine the bearing value of the yellow clay, a load test was made, with the results indicated on the accompanying chart. In addition, undisturbed samples of the material were sent to the soils-testing laboratory at the state university, to obtain a check on the bearing tests. Based on the studies of load tests and laboratory results, it was decided to place the footings for the majority of the buildings on the yellow clay, using a bearing value of 2,500 lb. per sq.ft. On some of the heavier buildings, such as the State of Texas Building and the art museum, concrete piles driven to the sand were used; the compact nature of the sand required the use of jetting to get these piles down.

Fitting old into the new

A number of old buildings on the park site were remodeled, fitting the old construction into the new. The Transportation and Petroleum Building, for example, will have a gross area of 123,872 sq.ft., of which 53,000 ft. will be new construction. The contract calls for completion on April 15 and was let at a cost of $399,627. Of the combination of buildings that will house the industrial and the electrical and communications exhibits, only one is new; an existing 185x500-ft. building is being remodeled, and a new addition, 757 ft. long and of varying width, is being erected. This building, when completed on April 15, will have an area of 150,444 sq.ft. and will have cost $427,000. These two buildings have steel frames.



SOIL-BEARING TEST RESULTS which determined a design value of 2,500 lb. per sq.ft. for the foundations.

The livestock and animal husbandry building is a two-story concrete structure, part one-story and part two-story, with an area of 45,423 sq.ft. The second floor, 3,000 sq.ft. in area, is devoted to quarters for the handlers. On the first floor there are 15,000 sq.ft. of stalls, with concrete-paved aisles and clay floors, and 17,000 sq.ft. with both aisles and floors paved. The rest of the ground floor is devoted to an exhibition arena, service facilities and concessions. Construction includes concrete foundation and roof, with clerestory roof for the arena. The $139,474 contract includes an air-conditioning installation.

Service utilities

Plumbing ranges from industrial applications through public building requisites down to the very necessary and particular demands of the agricultural and livestock groups. It will have cost some $60,000 when it is completely installed.

All waste drains are of heavy cast-iron pipe, which is connected to the main sanitary sewerage system of concrete pipe provided by the city of Dallas in the park streets. Exposed interior downspouts are of galvanized steel pipe, and those in concealed areas are of galvanized wrought-iron pipe. Where downspouts from pylon roofs, flower boxes and such are difficult of access, copper piping is used.

Wastes from the floor areas of the livestock pens run to outside catchbasin interceptors before entering the city sewers. Likewise drains from restaurants and eating places are provided with grease-trap interceptors.

Plumbing fixtures of a permanent type are used, and utility corridors are provided back of them so that as much operating mechanism as possible is inaccessible to the public.

Several illuminated water fountains are located throughout the grounds, each of different design and form. Where large water volumes are to be handled, pumps will be used to draw the water from the fountain pools and discharge it to the fountain nozzles. For all pools the total volume of water pumped will be about 8,000 gal. per minute, one fountain alone requiring half that amount. Overflows and wastes from the fountains are connected to the storm sewers.

Ventilation

Mechanical ventilation is being used in all exposition buildings. Air calculations were made on a basis of 6 cu.ft. per square foot of floor. The plan adopted provides for large attic spaces, to serve as plenum chambers from which the air rising from the exhibit spaces will be exhausted by electrically-driven fans. In general, centrifugal fans are used in units having a capacity of 40,000 cu.ft. per minute, and requiring about 5 brake-hp. In some cases it was possible to use disk-type fans in units of 16,200-c.f.m. capacity. The average cost of installation was 13½c. per sq.ft. of floor area.

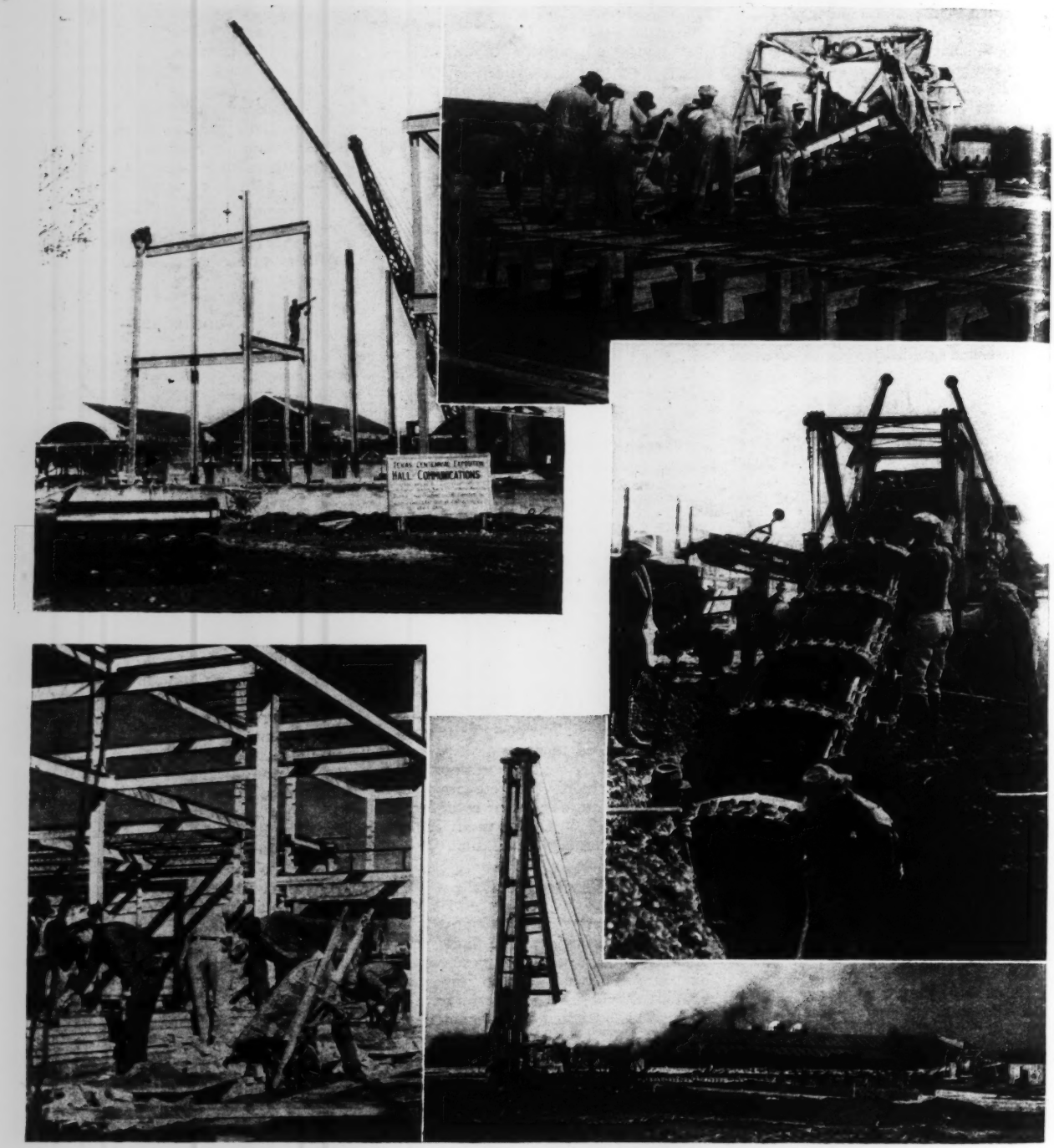
Lighting

Lighting of the grounds and buildings is unusual in that all illumination will come from concealed sources. Some 3,000 floodlights will be used to illuminate the buildings, facades, towers, banners and landscaping. At night large areas of buildings, finished in neutral colors, will glow under the application of vari-colored lighting. Floodlights will be concealed by landscaping, set back of buildings and built into pylons.

Combinations of lighting units and banner standards will light streets, roadways and walks. These multiple-type units will be served from transformer vaults at various locations throughout the grounds. Approximately 350 units will be installed, their designs harmonizing with the buildings and character of different areas in the park. Some of the newer light sources will be incorporated. A battery of 24-arc searchlights, with a total of 1,500,000 cp., will pierce the night sky and illuminate fireworks and other spectacular effects. Striking color effects will be created by underwater lighting installed in a number of fountains and the lagoon.

The unusual length of the buildings requires longer feeders than are ordinarily used. In the majority of cases branch feeder wire is carried in a 6x6-in. metal wireway. About every 40 ft. there is a load center with branch wiring to serve two booth spaces with 4 watts per sq.ft., plus corridor lighting for the area involved.

Switching control is concentrated in



CONSTRUCTION ACTIVITY on the grounds of the Texas Centennial Exposition at Dallas.

one main room. In general, there are four classes of lighting service required: interior lighting, to be killed at closing time; interior lighting and power for work lights and utility spaces, where 24-hour service may be required; decorative and outside lighting, required after nightfall only; and such exit and other lighting as is desirable or required to maintain an emergency source in event the regular system fails. For emergency purposes batteries are provided with automatic throwover switches, designed to transfer the load to the battery source upon failure of the normal source, and to transfer it back upon restoration of the normal current supply.

More than 3,000 kva. is required for the exterior lighting. Initial installation requires 20,000 incandescent lamps and 20,000 ft. of gaseous tubing. Exterior lighting will be principally architectural, creating much of the decorative effect. For this purpose 6,500 kva. will be needed.

Sources of power and lighting are transformer banks at each building supplying 120/208 volts. The thirty-odd banks have a total kva. capacity of 9,000 to 11,000. All feeders are four-wire, three-phase. Power wiring is three-phase, and branch lighting circuits are either two- or three-wire. The set-up

would furnish residential and commercial power and light for a city of more than 100,000 population.

Estimates set the cost of the floodlighting at $150,000, and street lighting will cost some $80,000. The distributing system was installed at a cost of $153,000. From present indications the entire interior and exterior lighting program will approximate $500,000. This figure includes the arc searchlights and illuminating effects installed by private exhibitions.

A fire-alarm circuit adds 23 boxes and 30 remote-control points to the Dallas city fire-alarm system and requires about 16,000 ft. of underground conductor cable.

The grounds are to be completely covered by a public address system. About 50 loops are provided to pick up programs for the system and to broadcast on national radio chains.

MAJOR BUILDINGS OF TEXAS CENTENNIAL EXPOSITION

	Est. Cost	Area Sq.Ft.
Hall of Administration	$135,000	.....
Transportation & Petroleum Bldg.	399,627	123,872
Varied Industries & Electrical and Communications	427,000	150,444
Hall of Foods & Beverages	117,000	33,528
Livestock Bldg. and Remodeled Arena	225,000	109,809
Maintenance Shop	35,000	.....
Poultry Bldg.	35,000	27,203
Federal Bldg.	325,000	80,000
Negro Life and Culture	50,000	15,000
Texas Hall of State	1,000,000	.....
Natural History Museum	245,643	Built by city with PWA grants
Horticultural Museum	214,890	
Domestic Arts Bldg.	86,488	
Band Shell and Open Air Theatre	136,667	
Fine Arts Foundation	25,000	
Police-Fire-Hospital-Radio Bldg.	40,900	

Water service and sewers

A plan to supply a maximum daily attendance of 300,000 with water service and fire protection was worked out by Dallas engineers. Early estimates put the cost of the 16,000-ft. new underground system at $37,500, but it was raised to $45,098 when the plan was redesigned and advertised under the PWA. This, like the first estimate, included engineering costs. When the bids came in, five were within 10 per cent of one another. The work went for $39,717 exclusive of $2,000 engineering fees.

The project includes a complete underground water-distributing system with a 10-in. main crossing the park from north to south and a 16-in. line crossing from east to west; this 16-in. line will also serve that portion of South Dallas adjacent to the park. Serving all areas is a series of 26 fire hydrants with city pressure, varying from 60 to 70 lb. All water-service lines are of cast-iron and will be permanent. Inside the buildings the pipe materials vary, but they include galvanized steel, galvanized wrought iron and copper. Pumping will not be necessary as the city pressure is sufficient.

Natural gas for heating and for cooking in connection with the food exhibits will be furnished by the Dallas Gas Co., which will install a complete permanent system to serve all areas with high and low-pressure gas.

In designing the sanitary sewerage system, the plans and records of the Chicago Century of Progress Exposition were referred to and used wherever practicable. Of the 200 acres within the grounds, 105 acres are required to be served by new facilities. It was assumed that the average peak-day attendance would be 250,000, and that 60 per cent, or 165,000, would be on the grounds at one time. From the Century of Progress records this would give a peak load of 2,500 gal. per minute. When a curve was made up showing the rate of flow in millions of gallons per day, it was determined that the 105 acres to be served would contribute 3,500,000 gal. per day on each peak day. On this basis a $16,200 system of 11,800 ft. of new concrete line was planned, with pipe varying in size from 8 to 18 in. A coefficient of roughness of 0.013 was used in choosing the pipe. The minimum velocity in the sanitary sewer system is 2.4 cu.ft. per second.

The park area was fortunate in having three large trunk sewers to serve as outlets for the lateral storm-sewer system. Of these, one traversed the western edge of the property and was continued along the southern edge, and the third traversed the eastern boundary. Storm sewers, therefore, were distributed with the idea of utilizing the main trunk lines already existing, all of which were in good condition. Pipe used in the contributory system is of 36-in. maximum and 15-in. minimum size. All lines are rather short, so that the time element did not affect the design. An impervious percentage of 70 was used as a basis for the design, giving a runoff value of 2 cu.ft. per second per acre.

The sewers were laid deep enough to drain the artificial lagoon and reflecting pool as well as the playing field of the athletic stadium, which is 18 ft. below the normal ground level. Pumping will not be necessary for either the storm or sanitary sewerage system. A total of 20,300 ft. of new pipe went into the storm sewers, which were built at a cost of $58,275.

Paving and grading

A paving and grading program calls for about 100,000 sq.yd. of concrete and asphalt pavement at a cost of $250,000. The pavement is mostly of a permanent nature, the roads consisting of a reinforced-concrete base with asphalt wearing surface and concrete curbs, walks and gutters.

In carrying out the grading program, trees were saved wherever possible and moved to other Dallas city parks, but more than 400 had to be destroyed. More than 6,000 cu.yd. of concrete were moved from the grounds, most of which was used in building roads and retaining walls in city parks. About 2,000 cu.yd. of this material are being crushed and used as the base for the paving.

The foundations of the razed buildings were removed to a depth of 2 ft. below the normal ground level. This operation netted 1,500 cu.yd. of material, and more than 55,000 sq.yd. of macadam and gravel was salvaged from the streets. This material will also be used in paving.

In the grading program were included excavations for the reflecting pool and the lagoon. From these two areas 70,000 cu.yd. of earth were removed to other parts of the property, where it was spread to create better drainage and to give a pleasing topography. Some 12,000 cu.yd. of earth were removed to the grounds as the result of subgrading for the roads. The cost of the grading project was $49,420.

Landscaping

A $225,000 landscaping program is under way in the park. Native trees and shrubs of Texas are being used for the major planting, with East Texas pine, several varieties of Central and North Texas oak and Rio Grande Valley palms. Gulf Coast magnolia, yucca and cactus from the Big Bend Country and other flora indigenous to Texas are being featured. Large flower gardens of Centennial roses are being planted, with many Texas wild flowers also being used. As the central feature of the Esplanade of States, there will be a reflecting pool 70 ft. wide and 750 ft. long. Walks surrounding the pool will be bordered by enormous flower beds in which roses and Texas ornamental shrubs will be shown. Flowers of other states will be displayed as a feature of other plantings. In the Cultural or Civic Center is a large artificial lagoon, the center of an attractive landscaping scene. The lagoon varies in width from 200 to 350 ft. and extends 1,000 ft. from tip to tip. In the center will be a large ornamental fountain on a small island.

The construction program is being carried out under the direction of three technical staffs. The Centennial Corporation staff is composed of Ray A. Foley, director of works; George L. Dahl, architect; Myers, Noyes and Forrest, consulting engineers, all of Dallas; Hare and Hare, consulting landscape architects, Kansas City; and H. A. Frankenstein, superintendent of construction, Dallas. On the Dallas Park Board staff are W. Brown Fowler, consulting architect and chairman; Jean H. Knox, consulting engineer; and F. K. McGinnis, landscape architect. Personnel of the Dallas city staff includes Hal Moseley, city manager; A. P. Rollins, director of public works; Eugene Couch, assistant to the director; C. T. Baer, chief designing engineer; and J. T. Conroy, superintendent of construction.

Caverns Under Dam Corewall Set a Nice Repair Problem

Water finds the cavern that grouting missed and scours an outlet under the dike and corewall of the Ontelaunee Dam of the new waterworks at Reading, Pa.

By Farley Gannett
President, Gannett, Eastman & Fleming, Inc., Harrisburg, Pa.

THE TELEPHONE on the office table behind me rang energetically, disturbing a pleasant reverie, in which I was congratulating myself because we had recently successfully completed the construction of a job we had been building for over a year. I felt well pleased (not a normal condition of mind since 1929, one may be assured).

As I say, the sharp command of the telephone brought me back from a possible vacation, and I took my feet off the desk, spun the swivel chair around and put the telephone to my ear. "Yes," I said to our operator. "Mr. O'Reilly calling," said the telephone girl. "Now what does Tony want?" I thought. "We're all through with his job (the one I had just been dreaming about) and we are all paid off; the retained percentage has been received, all the PWA forms and accounts are filed and approved, even to the 48c. which the PWA auditor said we owed one of the carpenters, who didn't know it himself." Mr. O'Reilly was the chief engineer of the Water Bureau at Reading, Pa., for which we had just built the Ontelaunee Dam (*ENR*, Sept. 6, 1935, p. 329), and we had become very good friends during the last year.

"Yes, Tony," I said. "What can I do for you this beautiful—?" He didn't wait for me to finish my salutations, interrupting my greeting and seriously disrupting my happy frame of mind by saying, "There's hell to pay over here. The rain of the last two days has filled the reservoir up to about 2 ft. over the spillway on the dam and now the water is roaring away, under or through the dam, and it looks as if the whole thing is going out. Can you come right over here?" "You bet I can. I'll be over in an hour and a half," I replied.

Wasn't that nice? The city of Reading had a maintenance bond of ours for a year in the amount of several hundred thousand dollars on the job, and if they could pin this failure on workmanship in any way, good-bye vacation and even the baby's shoes!

I called our general manager on long distance and told him the story. He was 40 miles away to the east of Reading, and I was 60 miles to the west. We arranged to meet at the dam in an hour and a half. On nearing the job, I was relieved to see that the dam was still there, and on top of the long low-earth fill with its neatly finished macadam road and white-painted guard fence stood O'Reilly and a crew of engineers, city officials, our general manager and our superintendent, who had been in charge of the job. I saw water boiling up out of numerous holes just below the dam and the streams thus emerging joined to form a roaring torrent that had already cut itself a deep channel through the clay overburden, to the creek below the spillway.

On the drive over I occupied myself in speculating on what had happened, and what I saw pretty well satisfied me on one very important fact—namely, that Gannett, Eastman & Fleming, the contractors, were not to blame. This water was quite evidently boiling up from under the corewall and wasn't coming through our work. Then I climbed up on top of the dam and greeted the waiting mourners with a smile that wasn't all forced.

On looking down at the upstream face of the dam I saw that the water was being sucked down through the ground into the limestone rock which underlaid the dam in several places, two of which were under the upstream slope, and the dam was rapidly sloughing off into these holes (Fig. 4). If the process continued long, it was probable that a breach entirely through the embankment might thus be formed and then good-bye dam. This was going on chiefly at two places about 100 ft. apart. Below the dam and opposite the worst place the water was coming up (Fig. 3) just at the foot of the downstream slope, and that embankment too was sloughing off into the stream and washing rapidly away. The rain had stopped the night before, all the blowoffs were open, and the water level in the reservoir had begun slowly to drop.

The drainage area above the dam is 192 square miles, and the rainfall had been 6 in. in the last two days. The stream had risen very suddenly and filled the four-billion-gallon reservoir before anyone had realized it possible. Blowoffs cannot help much with a stream that size, even though there are four of them each 36 in. in diameter.

Here was the picture as it appeared to Mr. O'Reilly and the assembled officials who stood there sadly observing what undoubtedly looked to them like the wreckage of their hopes. For several years the city had been preparing to build this storage reservoir to assure an almost perpetual water supply for Reading. Nearly $2,000,000 had been spent in acquiring land, water rights and in construction. When they stood there and saw the water pouring under the structure, it looked to them as if all

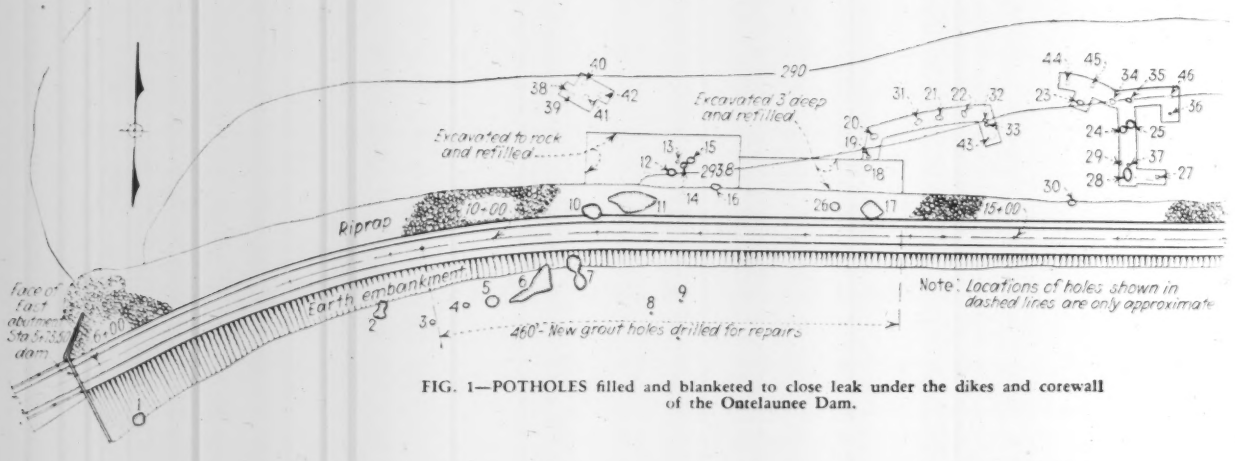


FIG. 1—POTHOLES filled and blanketed to close leak under the dikes and corewall of the Ontelaunee Dam.

FIG. 2—ROCK CONDITIONS disclosed when the ledge was laid bare under the spot in the upstream toe of the Ontelaunee Dam where most of the water disappeared.

promote clear and reasoned thinking. There was no way to lower the reservoir any more rapidly. We might cut a breach through the dam, but there was no way to control the water, and the breach would probably widen as soon as the water started to flow through it and destroy a large part of the structure. The only thing we could do was to pray for no more rain and hope the water level would fall and the sloughing stop before an opening had been formed entirely through the embankment.

We all adjourned to the city hall in Reading to explain the situation to the mayor and city council. With the state and city engineers in agreement with us, it was not long before we had satisfied the city officials that the water was going under the very bottom of our work. Inasmuch as we were familiar with the situation and had men and machinery near by, we were retained then and there to repair the damage and prevent its repetition. It was put up to the city and state engineers to determine what plan to adopt to stop future leaks.

As soon as the water had been lowered sufficiently from the base of the dam

their efforts and all this money might be lost, to say nothing about their reputations; and to add a little to the joy of the occasion, one should remember that this all happened in July, 1935, and a city election was set for Nov. 3. If permanent repairs could not be completed before that time, their chances of re-election were small indeed.

Of course, every one wanted to know at once what had happened, how the water was getting through and why, who was to blame, and what to do about it. Naturally my first thought was self-protection, and by this time I was thoroughly satisfied that the water was going down through the limestone upstream of the dam, was passing down under the corewall and under the bottom of the 5-ft. spaced grout holes and then up again through the rock and through the light clay overburden, and that we were in no way to blame. Would it be possible, however, to satisfy the city officials of this? I felt sure the engineers would understand, particularly those familiar with the job, who knew that we had pumped from 3,000 to 5,000 bags of cement grout into each of several grout holes during construction. That proved, of course, that there were wide channels and large caverns underground in the limestone and supported my theory that this water was roaring through one or more of them which had been missed by the grout holes or that lay below the bottom of the holes, that extended, as a rule, 40 to 50 ft. below the ground surface. We went into a huddle there on the dam with the water racing away under us, and finally every one agreed on that conclusion. By this time one of the state engineers having supervision over dam construction had arrived. He was thoroughly familiar with the situation, having inspected the work often during construction, and he too agreed that we had the right theory concerning the way the water was getting away.

FIG. 3—TWO OF THE LARGER HOLES below the dam out of which the water poured.

But what to do? How prevent the dam from gradually sloughing away into the sink holes? All the time as we stood there we could see and hear the upstream and downstream embankments sloughing off and dropping into the water above and below the dam. It was not a pleasant sight or sound and didn't by practically emptying the reservoir through the blowoffs (fortunately there was no more rain), we located 37 sink holes above the dam where water entered the rock seams and nine below the dam where it emerged. Some holes were over 100 ft. upstream from the upstream toe and some nearly as far below the downstream toe. These were plotted, and we found that they all lay generally in a zone about 200 ft. wide, crossing the dam at an angle of about 30 deg. with the axis of the dam (Fig. 1), so that it appeared that the main seam or

FIG. 4—HOLE in upstream face of dam into which water was sucked, pulling the embankment and riprap with it.

seams lay in this zone. The embankment had cracked badly on the top, so that large fissures appeared in the macadam paving at the point where the sloughing of the embankment had occurred.

Our plan was twofold: first, to try to prevent as far as possible the entrance of water to the underground water course under the dam by blanketing the upstream area where water had entered; and second, to tighten and deepen the grout cutoff under the dam.

The first thing was to remove the entire disturbed area of the dam where it had sloughed and cracked and replace it with new well-compacted material. We also excavated down to rock an area upstream 150 ft. long and 50 ft. wide at the point where the worst leak seemed to occur and replaced the cover with rolled clay. A strip 100 ft. wide and 200 ft. long along the upstream base of the dam to the south of this spot was stripped 4 ft. deep and replaced with a rolled clay fill, and all the sink holes were dug out and refilled with tamped clay.

We drilled another set of grout holes considerably deeper than the original set of holes and staggered them between the old holes all the way across the 450-ft. section of the embankment, which seemed possibly to be at fault. The dam is 2,700 ft. long, and all but this stretch was perfectly tight. Forty-six additional holes were drilled, the maximum depth being 75 ft. below the top of the dam. Over this stretch 82 holes were originally drilled, having an average depth of 22 ft. below the top of the concrete mat that covered the rock. The original holes took 2.6 bags of cement per foot of hole, and the new holes took 8.2 bags per foot. The hole that took the greatest amount of grout in the original work in this stretch took 366 bags, while in the new work one hole took 3,839 bags and one took 2,007 bags. This grouting record certainly showed that we had struck a very pervious area and gave up hope that the passageways under the dam had been closed.

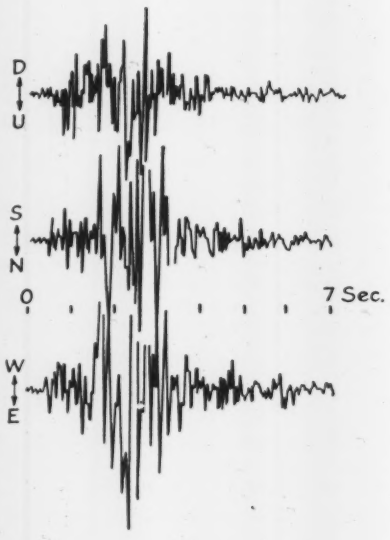
After receiving our instructions, we started work promptly with shovel, crane, roller and drills and worked continuously, under favorable weather conditions, so that on Oct. 30 the job was finished. In December another flood occurred, putting a foot of water over the spillway, but not a drop of water passed under the dam.

P.S. In the November election the mayor and all three councilmen were defeated by opposing candidates, who used the dam leak as one of their strongest points of attack against the reigning officials.

Remarkable Record Obtained of Montana Earthquake

ONE of the most valuable accelerograph records of an earthquake thus far obtained was secured by F. P. Ulrich and D. S. Carder, of the U. S. Coast & Geodetic Survey, at Helena, Mont., on Oct. 31. Although the main shock of Oct. 18 was missed since the instruments had not been brought to Helena at that time, the records of the seismograph at Bozeman show that the after-shock of Oct. 31 was practically equal in intensity to that of the 18th. In fact, it is stated that the amplitudes of the first movements are much larger in the after-shock than in the main shock, although the end portion is less active. No complete record of a destructive shock has ever before been obtained in this country at a point so close to the epicenter, in this case about 5 miles.

A detailed report on the records obtained with the instruments set up in the basement of the Federal Building in Helena is now in preparation; the record of the Oct. 31 after-shock is shown in the accompanying illustration. The outstanding facts about this record are reported by the U. S. Coast & Geodetic Survey as follows:



ACCELEROGRAPH RECORD of the Oct. 31 after-shock in the series of earthquakes that occurred in the vicinity of Helena.

Short-period waves dominate all three components, and because of the irregularity of the trace it is difficult to recognize periods greater than a few tenths of a second. On one of the horizontal records a wave of 0.13-sec. period reaches an acceleration of 0.13 *g*., corresponding to a displacement of a little more than 0.5 mm. Waves of 0.3 sec. seem to be next in prominence and then some of possibly 1-sec. period. The vertical accelerations are generally about two-thirds of the horizontal component values. Some of the periods are as low as 0.08 sec.

Waves of 0.3 sec. are apparent, the same as on the horizontal components, and there seems to be a wave of roughly 1.8-sec. period. It is expected that a better analysis of the periods involved will result from integrating the curves. The duration of the main portion was only about 3 sec. The extreme motions are believed to have been only about one-half as great as at Long Beach in 1933, while the duration was less than one-half.

In addition to accelerograph observations, valuable data were also obtained with a vibration meter.

Record Floods in Northeastern States—II

Special report supplementing the reports of the March floods in the Northeastern States published last week—The effect of the flood on city water supplies summarized

REPORTS of the great floods that inundated wide areas in the river valleys of the Northeastern States during the period from March 18 to March 25 were published in last week's issue (p. 441 and 466). Additional information concerning the floods came in as that issue was going to press, too late to be included with the group of articles published therein. Information concerning the effect of the Ohio River flood at Wheeling, the floods in eastern Canada, and the exceptional high waters in the Finger Lakes region of Western New York is included in the following report, also information as to the manner in which emergency water supply conditions were met in some of the New England cities and at critical points in New York State.

Wheeling Recovering From Its Worst Flood

By H. W. Richardson
Assistant Editor, Engineering News-Record

WHEELING, W. VA., and neighboring towns on both sides of the Ohio River are slowly recovering from the highest flood in history, which reached its peak at 2 p.m., Thursday, March 19. The story of Wheeling is a repetition of that of Johnstown, Pittsburgh, Hartford and other flood-stricken communities recorded in these pages last week. The water rose to unprecedented heights, far above predicted stages, and upon receding left a sodden mass of wreckage, mud and slime. Thousands of people were made homeless, and hundreds of business establishments were ruined. Wheeling Island, a residential section of the city with a population exceeding 8,000, bore the brunt of the flood. The entire island was inundated, in some places to a depth of 20 ft. At the north (upstream) end of the island a low wooden tabernacle, several houses and scores of garages and smaller buildings were completely wrecked, and trees, telephone and power poles were torn out. Much of this wreckage was deposited in the central part of the island; in the low-lying south end mud was deposited to great depths.

Besides Wheeling Island, the south part of the city of Wheeling suffered severe inundation. This section comprises the poorer residential part of the city, and damage to the old, poorly built homes was heavy. The lower business district of Wheeling was also under 12 to 15 ft. of water. The Wheeling & Lake Erie R.R. freight and passenger stations, the freight stations of the Baltimore & Ohio and Pennsylvania railroads and the yards of all three roads are in the flooded district. The Pennsylvania and B.&O. passenger stations were both flooded. Plants of the two newspapers were inundated, and one paper put out a small-sheet flood edition set by hand and printed on a foot-pedaled job press on the second floor. Several stores saved their large plate glass from damage by boarding up the windows.

The previous all-time flood record was in 1884, when water reached a stage of 52 ft. on the Warwick Dam gage, 4 miles above the city. The flood of 1913 reached a stage of 51 ft. on this gage. Ample warning was given of the present flood, but predictions placed the probable flood stage at 46 ft. At 2 p.m. on March 19 a crest of 55.5 ft. was reached at Warwick Dam, the flood holding at this stage for four hours, after which it dropped very slowly. The water rise of 10 ft. above predicted stage caught many residents of both the island and the south part of town unawares and made extensive rescue work necessary. The city engineer worked with the police and fire departments in directing the rescues, using a city map on which flood contours by 1-ft. stages were plotted. By means of this map the areas in immediate danger were covered as the waters rose. The same map was valuable in starting the clean-up work, as the city forces could be concentrated on the higher sections while remaining sections were still under water.

The municipal water system was not damaged and never ceased functioning. Filtered river water is the source of supply, and pumping and filter plant, protected by dikes, both escaped flooding. The chief damage to city property is in the streets, though the extent of street loss cannot be accurately determined until all of the mud and debris is removed. Some damage to sewers is known, but here also the full extent cannot be ascertained at this time. It is known that many of the sewers are plugged, but whether from excessive mud flushed into them or from collapse and breakage is undetermined.

Some damage was reported to bridge floors and railings, but on the whole the bridges came through in good shape. The Market St. concrete-arch bridge across Wheeling Creek was covered to the tops of the lamp standards but was not damaged. The only damage to the two bridges leading to Wheeling Island was the loss of guy sway cables, leading from the center of the suspension bridge span to anchors near shore, which were either carried away by debris or cut to prevent a heavy side pull on the span.

Telephone, power, and gas lines went

TYPICAL OF THE DEBRIS left by the flood is this mass of tangled wreckage in Virginia St., Wheeling Island.

out on Wheeling Island and in the southern part of the city, but emergency service was established within a few days.

City engineer directs cleanup

About 2,000 WPA and CCC workers are cleaning up the debris and mud, working under the direction of Harry Conrad, city engineer, and Art Hendrickson, superintendent of streets. Most of the combustible rubbish is being burned on a huge pyre on the island; the mud and other debris is dumped along the bank of the river at several points and is pushed into the current by a bulldozer. As the water system remained in service, the city street department flushed some of the mud into the flood as the waters receded. The accumulation of debris on Wheeling Island was the worst that this reporter saw in touring the entire Pennsylvania and Ohio Valley flood districts. It was piled higher than the porches in some streets.

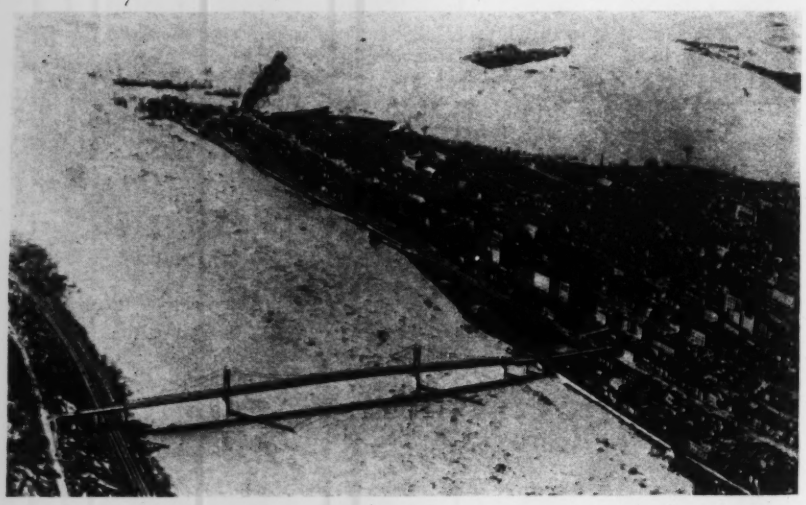
Norris Dam Lowers Tennessee Flood Crest

THE FLOOD CREST on the Tennessee River was reduced 3 ft. at Chattanooga by the water held back by Norris Dam, according to estimates made by the local weather bureau office and checked by engineers of the Tennessee Valley Authority.

Flood stage at Chattanooga is 30 ft. The crest reached 37.1 ft. Sunday night, March 29, with a volume of 232,000 sec.-ft. Norris Dam on the Clinch River, a principal tributary of the Tennessee, withheld 40,000 sec.-ft. With this volume added the crest at Chattanooga would have reached 40 ft.

An estimate of what a 40-ft. crest would have meant to Chattanooga made by the *Chattanooga News* states that the direct saving can be put as several hundred thousand dollars, and that indirectly more than 5,000 people benefited.

TWO HOUSES swept from their foundations on the north end of Wheeling Island lodged against a third, and all were wrecked. The force of the flood drove a tree and several timbers through the sides of two houses above the second-floor level.



PORTSMOUTH, OHIO, alone among the cities in the Ohio River Valley, saw the flood crest pass without inundating a large part of the city. Back in 1909 the city began the construction of a concrete wall on top of the levees that had been thrown up in the past in a vain effort to keep the Ohio and Scioto Rivers out of its streets. The wall was completed in 1928 at a cost of $750,000. The wall, 18 in. thick at the top and 30 ft. high at the highest points, is backed by a heavy earth fill. Its crest is at 62-ft. river stage. The flood this year rose to 60 ft. The Ohio River is in the foreground. The bridge into the watery waste in the background is over the Scioto River.

Central New York Repeats July's Floods

By S. C. Hollister

Professor of Civil Engineering, Cornell University, Ithaca, N. Y.

HEAVY SPRING RAINS and frozen or saturated ground produced the high floods in the Finger Lakes region and the upper Susquehanna watershed of Central New York, during the week of March 16. Precipitation was the highest ever recorded for March at the Ithaca station of the Weather Bureau, with a total to 8 a.m., March 21, of 6.25 in. against a previous high record of 4.75 in. (1896); the normal March precipitation is 2.31 in.

The destructive floods of last July were due to quite different conditions, being caused by a storm that consisted of a succession of cloudbursts which passed across the southerly end of the Finger Lakes region and the northerly portion of the Susquehanna watershed from Hornell to Oneonta. In some localities 11.5 in. of rain fell in four days, of which 7.67 in. fell in 24 hours.

Flood control is essential in this territory. Spring and fall floods of an intensity requiring control are of frequent occurrence in the region. Present losses, in the absence of protection, are indicated by the fact that the cost of the flood of last July approached $40 per capita over an area embracing 16 counties. The present flood will in many places greatly exceed this unit cost, and in addition involves a much larger area.

Successive rainstorms

The March floods in the Finger Lakes area began with a rainstorm at the Inlet valley at the southern end of Cayuga Lake on March 11 and 12. This valley has a drainage area of about 100 sq. mi. At the same time rising temperature caused a general thaw throughout the region.

Following on this, a four-day rain over the whole region began on the 17th, preceded by a 4-in. snowfall on the day before. Because of the saturation of the ground the runoff was rapid. Cayuga Lake rose to the unprecedented level of 386.9 ft., 0.36 ft. higher than

the crest reached last July and 3.5 ft. above normal. Corresponding conditions prevailed to the south over the upper Susquehanna valley.

Hundreds of homes on the Ithaca flats were flooded. Rail and highway traffic through Ithaca was interrupted for four days. Lake Onondaga to the north, at Syracuse, rose to 4 ft. above normal, and was still rising at the end of the week. During the same period an ice storm extended from Rochester to Binghamton, completely disrupting communication lines and doing half a million dollars' damage to orchards in the region. The Susquehanna was swelled to unprecedented flood stages. The Chenago at Binghamton rose to 2 ft. above the crest level reached last July and the Susquehanna to 5 ft. above that of July. These flood heights at Binghamton exceed anything on record.

Finger Lakes conditions

In order that the water conditions in the Finger Lakes region may be understood it is necessary to look at their connection with Lake Ontario. Seneca and Cayuga Lakes are the major basins of the region; Keuka, a smaller body, drains into Seneca Lake, which in turn leads into Cayuga near the northerly outlet of the latter. Cayuga Lake discharges through control gates into the Seneca River, a link of the state barge canal. Lake Canandaigua drains into the Clyde River, which in turn flows into the Seneca and carries to the Seneca River the main line of the barge canal from the west.

The Seneca River is a level reach from the outlet of Cayuga Lake to the Baldwinsville lock and dam. From Baldwinsville to the Oswego River lock at Phoenix there is another level reach. Northward from Phoenix the Oswego River flows from Fulton to Lake Ontario at Oswego, with most of its drop below Fulton. The rate of flow in the river here is determined by the water passed over the dam at Phoenix.

The Seneca River reach between Baldwinsville and Phoenix also receives the Oneida River from the east, which brings with it the overflow from Lake Oneida, the large "thumb" lake. It is also connected by canal to the smaller Lake Onondaga, at the head of which stands Syracuse.

Control works necessary

Flood control works appear to be necessary at the outlets of Seneca and Oneida Lakes in order to prevent excessive flooding of the locks and of the canals lying by. Control works are equally needed on the upper Susquehanna. No works now exist along this water course, and as a result each flood passes downstream to spread havoc along the full length of its course through two other states.

Record Floods In Eastern Canada

By Robert F. Legget,
Montreal Correspondent, Engineering News-Record

THE MARCH FLOODS proved to be the worst in recorded history of eastern Canada. The St. John River, the main stream of the province of New Brunswick, always susceptible to floods, rose higher than ever before inundating about 150 square mile. The water level in Fredericton, capital city of the province, was 23 ft. above normal and the village of Mangeville was cut off entirely for three days.

The most serious structural loss in eastern Canada was the complete collapse of the Canadian National Ry. bridge across the St. John River at Fredericton resulting from an ice jam behind the bridge. Collapse of the bridge released the ice jam and saved the city of Fredericton from further serious damage. This break-up in the river is the earliest that has occurred in the whole period of 111 years for which records have been kept.

The bridge was a single track through truss structure of nine spans built in 1884. The water in the river still is too deep to determine the extent of the damage to the piers.

In the lower St. Lawrence district in Quebec the Riviere du Loup did much damage. On the main highway between Quebec and Montreal much damage was

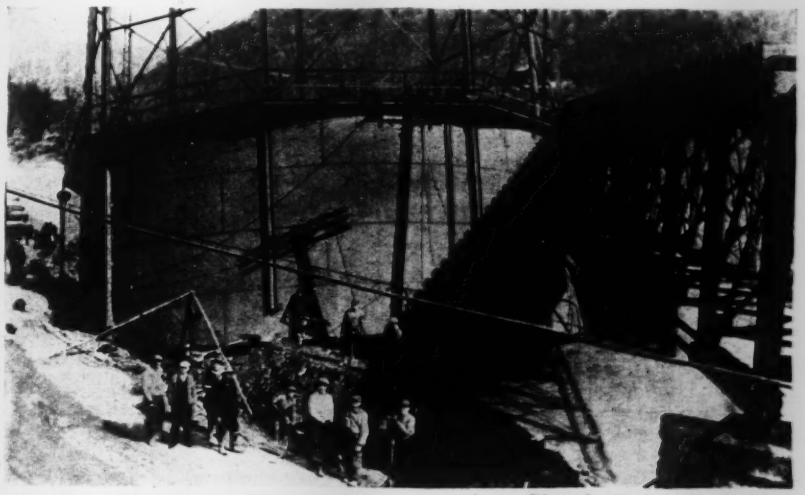


Photo by Shafer, Altoona Mirror

A GASHOLDER floated about half a mile down the Little Juniata River at Tyrone, Pa., and lodged against the Pennsylvania R.R. bridge, for a time threatening to wreck the bridge.

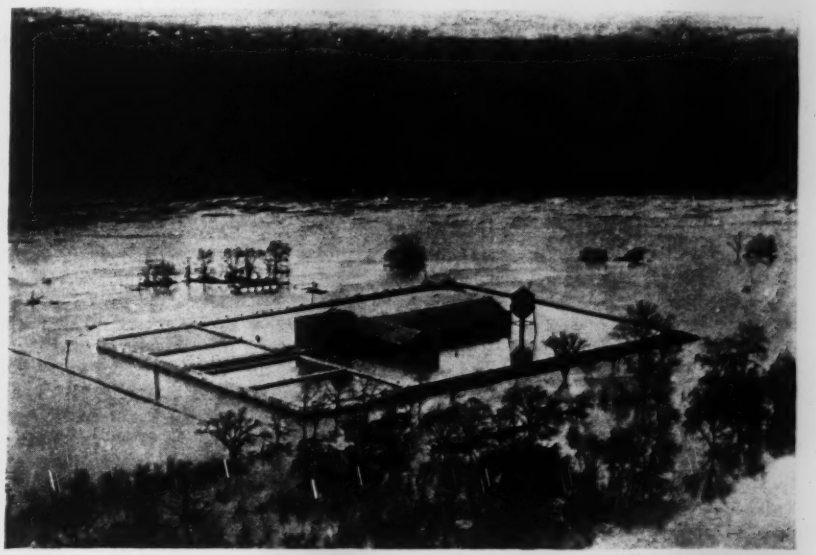


Photo by Kelley Studio

THE PUMPS AND FILTRATION PLANT at Hagerstown, Md., were submerged when the Potomac River rose nearly 3 ft. above the protective dike. This picture was taken as the water was subsiding.

done, including washing away a bridge over the Ste. Anne de la Parade River, a bridge which was being replaced by a new welded steel structure.

At Montreal, in the neighborhood of the Victoria Bridge, the ice movement in the river started on March 22 and forced ice onto the bridge damaging the guard rails and making it necessary to stop all vehicle traffic.

Flooded Water Supplies Safeguarded

By A. F. Dappert
Principal Sanitary Engineer, New York State Department of Health, Albany, N. Y.

THE FLOODS throughout the drainage sheds of the Susquehanna, Delaware, Mohawk, and Hudson rivers created serious conditions in communities along the main rivers. Flood levels considerably in excess of those of last July were reached. For the first time in many years sections of Albany, Schenectady and Rensselaer were flooded. High water in all these rivers, aggravated by ice jams, prevailed for a week before the flood crests were reached on March 18 and 19. Flashy runoff on the smaller upland streams, which caused so much damage in the flood of last July, did not occur to any marked extent, and as a result serious damage was confined primarily to the communities along the main rivers.

Engineers of this state health department were in constant touch with local health and waterworks officials and were able to render prompt assistance in the emergencies that developed. As in the July emergencies, we found local health officers and water superintendents alert to the situation, and effective measures have been taken to avert the possibility of serious water-borne outbreaks.

Binghamton waterworks shut down

The most serious conditions existed at Binghamton, where a considerable area was inundated and floodwater reaching the waterworks pumping station necessitated shutdown of the filter plant. For about 24 hr. the city was able to maintain some water service, being supplied by previously stored filtered water. An accute water shortage, however, developed which was met to some extent by utilizing the chlorinated well water supply of the Ansco Co. and obtaining about 5 m.g.d. from Johnson City through an interconnection between the two systems. The regular supply was off for about 72 hours.

The wells and pumping station at Endicott were flooded and a chlorinated emergency supply was developed from a deep well in West Endicott. Later, when attempts were made to resume operation of the regular supply, a motor burned out. Chlorinators were rushed from Newark, N. J., and Albany for use in connection with auxiliary supplies.

At Norwich, flood water washed out an 8-in. and and a 10-in. main, necessitating suspension of filter plant operation. Temporary hose lines were strung across a bridge and later replaced by an emergency pipe line to enable the resumption of water service. For a time unfiltered water was delivered, but at all times it was heavily chlorinated.

At Granville the regular water intake became plugged, necessitating use of an emergency intake. All water delivered, however, was adequately chlorinated.

AIRPLANES were pressed into service to distribute chlorinators through the flooded areas for sterilization of water supplies. This picture shows a truck from the plant of Wallace & Tiernan at Newark, N. J., delivering emergency chlorinators to an American Airways plane at Newark Airport for delivery to New England points. Truck shipments of emergency chlorinators were made to Pittsburgh, Greensburg, Endicott and Binghamton.

At Rensselaer possible leakage into the clear well necessitated shutdown of the filter plant. A sufficient supply of stored water was available to enable service to be maintained.

New England Supplies

By H. S. Knowlton
New England Correspondent, Engineering News-Record

AS SOON as it became evident that a serious flood condition was developing in the major river valleys in Massachusetts, the state health department sent out men to examine all water supplies. Within 24 hours samples of water from the small rivers were analyzed and assurance given as to their quality or steps had been taken to install chlorinators. The problem then became one of centralizing efforts to protect water supplies in the Connecticut and Merrimack valleys. In the Connecticut valley, the principal cities, Springfield, Chicopee, Holyoke, Northampton and Greenfield have upland supplies that were not affected by the flood.

In the Merrimack valley the water supplies lie close to the principal cities of Lowell, Lawrence, Haverhill and Newburyport. In Lawrence and Lowell the water supplies as well as the pumping stations were submerged; in Methuen the wells and pumping machinery remained inoperative while in Newburyport a surface water supply plant was submerged and pumping stopped. The ground-water supply was saved from submergence through the construction of sandbag dikes by men of the water department and the WPA.

At Haverhill the water supply is at a high level and no trouble was experienced. At Lawrence and Lowell water was chlorinated under the supervision of the department of health. In Lawrence the situation remained critical for several days while the filter plant was being put into condition for operation. Supplies were relayed from North Andover and Andover using pumping engines and hose lines.

The historic Lawrence Experiment Station was flooded to a depth of about 2 ft. over the laboratory floor.

Despite the many rumors to the contrary, the Massachusetts Department of Public Health did not order typhoid immunization for those returning to their flooded homes. The department took the view that the dilution was so great in the flooded valleys that the risk from typhoid was less than the normal risk during low water in the summer.

Water Supplies In the Potomac Valley

By R. B. Garabrant
Washington Correspondent, Engineering News-Record

HAGERSTOWN, MD., has two sources of supply, the "mountain system" which feeds the city by gravity and a pumped supply from the Potomac River. The mountain system has a maximum yield of 3.3 m.g.d. with 100 m.g. storage. This system was not damaged and is the sole source of supply for the 35,000 people in the towns dependent upon the Hagerstown supply. communities that have a normal consumption of 4½ m.g.d.

Normally, the mountain system is used to full capacity and the pumping plant makes up the deficiency. The pumping plant, sedimentation basin, filters, etc., are surrounded by a continuous dike with its top at El. 376. The crest of the March flood went to El. 378.7, and the entire plant was flooded to a depth of over 10 ft. and is expected to be out of service some weeks. Meanwhile the four communities are being rationed from the mountain supply, the railroad has closed its local water tanks and industries are operating on reduced supplies.

From Job and Office

Prefabricated House Built at Purdue University

ONE of the new houses being built as a part of the Purdue University house research program is a new product of General Houses, Inc., Chicago, designed to sell for less than $5,000. Three similar houses have been erected near Chicago. Howard T. Fisher is the architect in association with John A. Pruyn. The new house is of frame construction in contrast to this company's original product which utilizes steel panel walls. The frame is of copper-bearing steel columns and beams. Exterior wall panels are asbestos-cement board on the outside and fir plywood on the inside. Two sheets of aluminum insulation with a sheet of building paper between are installed in the wall air spaces. Ceiling panels are of the same general construction, except that they contain four sheets of aluminum foil with three air spaces and are of plywood on both the inner and outer surfaces. Partitions consist of plywood panels and copper-bearing steel studs. The roofing is of prefabricated panels of galvanized copper-bearing steel with joints sealed by flashing.

ONE of the asbestos-cement wall panels being installed in the Purdue prefabricated house.

Interior trim of copper-bearing steel, steel casement windows and steel door frames are used. The houses are equipped with nearly everything needed for immediate living except furniture, including an automatic oil-fired warm-air heating system and winter air-conditioning equipment. A wide variety of designs and plans has been prepared, and the houses are available either with or without garage and with or without a basement.

Scrapers Unload Bulk Cement From Railroad Box Cars

MUCH of the cement for constructing the Colorado River Aqueduct is delivered in bulk to points of distribution along the route. On the siding at Freda siphon, out toward the intake end of the aqueduct, box cars containing bulk cement are unloaded by two operators with the aid of an ingenious mechanical device for controlling the scraper. With this rig two workmen ordinarily unload a 300-bbl. car in about 2 hours. The actual unloading takes about 1⅓ to 1½ hours, and incidental work (principally removing the empty car and spotting a new car) makes the average over-all time about 2 hours per car, or four cars per 8-hour shift. Working at best speed, thirteen cars have been unloaded in three 8-hour shifts.

The unloading is done with a power-operated skip or "buck scraper" drawn by a steel cable. The cable runs to an automatic-control device, so arranged that the workman can pull the scraper and the attached cable back into the car to any desired point. When he slacks off on the cable, power is applied and the scraper is pulled, with its load of cement, to the door of the car. When the skip reaches the door, an automatic trip releases tension in the cable and the skip is ready to be moved back into the car to a new position.

In this way successive moves of the skip drag the cement to the door, where it falls into a chute and thence into a bucket conveyor which elevates it to a bin. A gate in the bottom of the bin feeds the cement into delivery trucks.

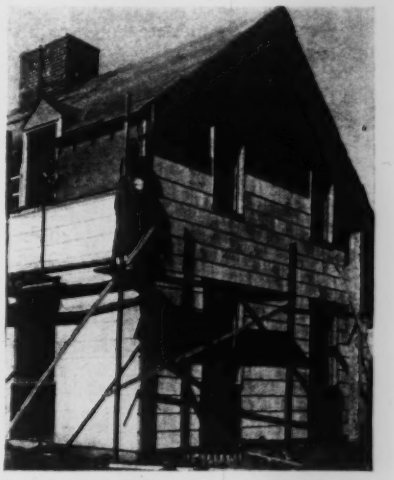
The second workman is a helper who takes his turn at the skip, shovels cement out of the corners and helps generally in moving the planks at the doorways and otherwise in cleaning up and expediting the job. Both operators wear a "gas-mask" type of respirator to exclude dust from the nostrils.

The automatic-control device is a mechanism attached to the shaft of the bucket-elevator sprocket. An extension of this shaft carries a drum which can idle on the shaft or, when a jaw clutch is engaged, will turn with it. The cable from the scraper is wrapped around this drum. Around the drum also is wrapped a line carrying a weight. The weight is raised by the winding up of the cable as the workman carries the skip back into the car. When he slacks off on the tension in the skip cable, the weight rotates the drum in the opposite direction and causes the jaw clutch to engage. After this, the skip cable is pulled by the rotating shaft up to a predetermined position at the door. At this point a lug on the cable trips an automatic release and throws out the jaw clutch, leaving the scraper line free for a repetition of the process. The mechanism is an adaptation of a device developed for use on power shovels.

The cement is unloaded and hauled by the Santa Fe Truck Co., of Los Angeles. The aqueduct is being built by the Metropolitan Water District of Southern California, of which Frank E. Weymouth is general manager and chief engineer.

New Type Insulated House in New Rochelle, N. Y.

AN EIGHT-ROOM HOUSE recently built in New Rochelle, N. Y., introduces a "triple insulated" wall developed by Johns-Manville. The timber studding is sheathed on the outside with wood-fiber insulating board on top of which a new product—cement-asbestos shingles—is applied. The wall spaces are filled with 4-in. rock-wool batts, and on the inside of the studs paper-backed wire mesh is attached as a base for the plaster. This type of wall is fire-safe, does not require painting, and its insulation value is exceptionally high. The shingles are manufactured either tapered or straight and in widths about twice that of wood shingles. In appearance they resemble weathered cedar shingles. A clapboard of the same material is also available. The roof of the house is of asbestos shingles on timber sheathing and is also insulated with rock wool.



EXTERIOR SURFACE of cement-asbestos shingles and boards being applied to "triple insulated" house walls.

The interior of the New Rochelle house contains a variety of synthetic

products. The recreation room in the basement is finished in wood-fiber board of different designs. Several of the floors are of asphalt tile of the same family as industrial flooring plank and asphalt bridge plank. The kitchen and bathrooms are finished in asbestos-cement boards of bright colors, which are provided by a baked-on finish.

Roller and Cross-Section Paper Aids in Letter Spacing

By Daniel D. Molony

IN SOME KINDS of engineering drafting, such as grade work and grid layouts, difficulty is encountered in giving uniform width, direction, spacing and position to lettering and other minor details. In order to overcome this difficulty and to increase the neatness and enhance the appearance of tracings, a method was worked out by using cross-section paper and a roller on which the tracing was wrapped.

After the line work is inked on the tracing cloth and the notes penciled on it, the cloth is rolled tightly on the roller; a few turns are usually all that is needed. A piece of cross-section, or square-ruled, paper, with tracings suited to the notes or lettering required, is then fastened to the drafting board, and the roller is mounted on two bearings, or behind two roller stops that are tacked to the board in such a position that the coordinates of the cross-section paper are parallel to the direction of the lettering. The tracing cloth is then pulled out far enough to bring the points on the layout to which the figures or lettering refers over intersections on the coordinate paper. A steel straight-edge or weight on the cloth will keep it taut.

Making Highway Fills With Minimum Settlement

FOR SOME YEARS the Oregon Highway Commission has been developing and improving its standard construction practice on highway fills with the objective of securing minimum settlement. Because the modern demand for roads is such as to require that pavement be laid soon after construction, it is highly desirable that there be as little delay as possible in getting the fill into condition for paving. The crux of the problem, of course, is to get adequate compaction without excessive expense.

Under the extreme rainfall of western Oregon it is hard to regulate the moisture content to exactly that amount desirable for maximum compaction; this can be done only by confining the construction in earth materials to the drier seasons of the year and operating during the winter months only in gravel or rocky material. Oregon practice indicates that the material should be neither wet nor dry, merely damp. By the judicious selection of the best season in which to open up any particular cut, by methods of dumping on the fill, by spreading in thin, uniform layers with bulldozers, by routing of trucks for maximum rolling effect, etc., it has been found possible to obtain fills that develop very little settlement. This has been done without the necessity of sprinkling or any other artificial control of the moisture content.

For example, summer-built fills, 60 ft. high, now are built in such a way that they can be depended upon to show not more than about 4 in., or one-half of 1 per cent, of settlement after standing through the ensuing rainy season.

The foregoing information was secured from R. H. Baldock, Salem, Oregon state highway engineer.

Bending and Direct Stress in Concrete Columns

F. C. Whitney
Structural Engineer, St. Louis, Mo.

THE GENERAL USE of the Cross method of moment distribution has created a genuine need for a direct method of designing concrete columns for bending and direct stresses. The following chart is believed to fill that need satisfactorily for square-headed columns, symmpetrically reinforced on four sides.

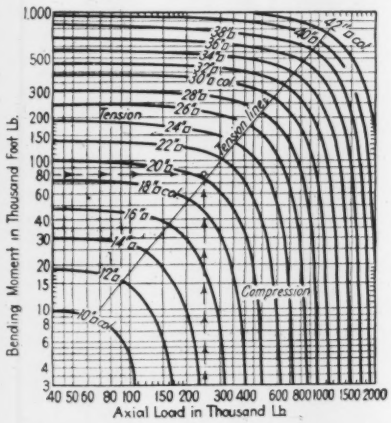


CHART for bending and direct stress in square handed columns reinforced on all four faces.

This is a logarithmic chart, with the curves representing 3 per cent vertical reinforcement; curves for 2 and 4 per cent reinforcement may be drawn in either side of the curves given. The allowable stresses are besed on the American Concrete Institute specifications for 2,000-lb. concrete.

Example 1—This is illustrated by dotted arrows. Given a bending moment of 80,000 ft.-lb. about the normal axis and an axial load of 250,000 lb., what size square column and per cent of steel are required for symmetrical reinforcement on four sides?

Entering the left side of the chart at the moment of 80,000 ft.-lb., extend a line toward the right until it intersects the axial load line of 250,000 lb. projected up from the bottom of the chart. This point of intersection shows that a 20-in.-square column with about 3.3 per cent vertical reinforcement may be used, or a 21-in.-square column with about 2.3 per cent reinforcement, or a 19-in.-square column with about 4.3 per cent reinforcement. The intersection falls on the tension side of the tension line and close to it, so that there is a tension on a very small part of the section.

Example 2—A 24-in.-square column with 4-per cent reinforcement symmetrically placed on four sides has an axial load of 300,000 lb. upon it. What bending moment may be imposed? Interpolating for the 4-per cent steel, the chart gives an allowable bending moment of about 180,000 ft.-lb.

Attention is called to the fact that the reinforcement is symmetrical on all four faces, which is the way it is usually found in actual practice.

Highway Striping Costs

WHEN the practice of placing a continuous center stripe on Oregon highways was begun some four years ago, the costs usually ran about $60 per stripe-mile. Improved methods and equipment have reduced the costs to about $22.50 per mile. A crew of eight men normally makes about 14 miles per day in going over old stripes or about 4 miles per day in placing new stripes. On new work the stripe has to be measured and laid out as a separate operation in advance of the actual painting. The lacquer paint used on the Oregon roads costs, wholesale, about $1.30 per gal.; for a 4-in. stripe the cost of paint per mile is about $13. Federal yellow has been found to be the most satisfactory color, particularly in fog.

WPA Progress Percentages

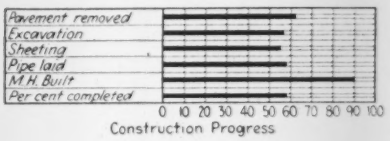
By G. F. Ramirez
Construction Progress Inspector

IN ADDITION to the usual daily reports, construction inspectors on WPA project 104, Brooklyn, N. Y., are now required to make weekly progress reports. These weekly reports are the result of the effort by the engineering section handling the project under the Brooklyn Bureau of Sewers, to record week-by-week progress on the numerous jobs throughout the borough. Most of this work consists of replacing old and leaky sewers with vitrified pipe.

Feeling that the practice of reporting percentages of the total amount of work accomplished in each job is still mere guesswork, the writer devised a simple arithmetical method of estimating percentages of progress. This method is adaptable to any construction job.

In determining percentages by this method, first consider the various steps of construction as separate items and then estimate the total amount of work involved in each item for a section, or for the whole job in man-hours. After this has been done, divide the total number of man-hours for each item by a convenient common divisor in order to obtain the simplest possible numbers, preferably all digits. Add all these simplified numbers. When the percentage of progress of the job is wanted, get the percentage of work accomplished in each item, in decimals, and multiply each by the corresponding number obtained by dividing the man-hours by the common divisor. Add these products and then divide the addition by the sum of the simplified numbers obtained by dividing the man-hours by the common divisor. The result, multiplied by 100, will be the percentage of progress made on the job.

The figures obtained by dividing the man-hours by a common divisor must be considered only as the weighted degree of difficulty or extent of each item in relation to the others, and the calculations are not to be necessarily accurate. If at various jobs the conditions are similar, the weighted numbers obtained on one job may be used for the others.



The application of this method is shown in the accompanying chart as it appears in a form provided by the Bureau of Sewers. The items of construction with their weighted numbers and percentages, in decimals, for the given job are:

	a	b	ab	Σ ab
1. Pavement removed.	8	0.63	5.04	Σ a
2. Excavation	51	0.57	29.07	
3. Sheeting	42	0.99	23.10	
4. Vitrified pipe laid..	16	0.98	9.28	
5. M. H.'s repaired...	1	0.90	0.90	
	118		67.39	0.57

The per cent of progress is this sum, 0.57, multiplied by 100, or 57 per cent.

Simplifying Sewage-Treatment Calculations

By James R. McComas
Assistant Sanitary Engineer, State Dept. of Health, Baltimore, Md.

DETERMINATION of the ability of a stream to absorb by dilution the sewage emanating from a known population may be accomplished quickly and easily by using the accompanying nomograph. It shows the relationship between streamflow per square mile of drainage, area, the biochemical oxygen demand (BOD) of sewage, the number of persons contributing sewage, and the discharge in cubic feet per second of streamflow per 1,000 population.

The solution of sewage-treatment problems of this nature is not dependent upon absolute arithmetical accuracy but is contingent upon certain data, some of which may be available in known quantities while the remainder must be assumed. Generally, these unknown terms are: the B.O.D. of untreated sewage—this may be assumed to have a range of 125 to 200 p.p.m.; the amount of dissolved oxygen that a stream may yield—assumed to be 4.0 p.p.m.; the quantity of sewage contributed per person per day—assumed to be 100 gal. In order to emphasize the simplicity of using the nomograph compared to the conventional arithmetical procedure, an example by each method is given.

With a minimum streamflow of 20,000 gal. per square mile per day, a drainage area of 100 square miles and a raw sewage with a B.O.D. of 160 p.p.m., the question is: How many persons may be permitted to contribute untreated sewage to this stream? A second question is: If the stream had only 20 square miles of drainage area, and the same amount of sewage from the same number of persons entered it, to what extent should the B.O.D. be reduced by some form of treatment?

1. Each 1,000,000 gal. of sewage has a B.O.D. demand of 160 p.p.m.; 160x8.33=1333.33 lb. of oxygen; 100 gal. of sewage (from 1 person) will require, therefore, $\frac{100}{1,000,000} \times 1333.33 =$ 0.1333 lb. of oxygen.

Each 1,000,000 gal. of streamflow will yield 4.0 p.p.m. of oxygen, or (4x8.33) = 33.33 lb. Therefore, the flow of 20,000 gal. from each square mile of drainage area will yield $\frac{20,000}{1,000,000} \times 33.33 = 0.666$ lb.

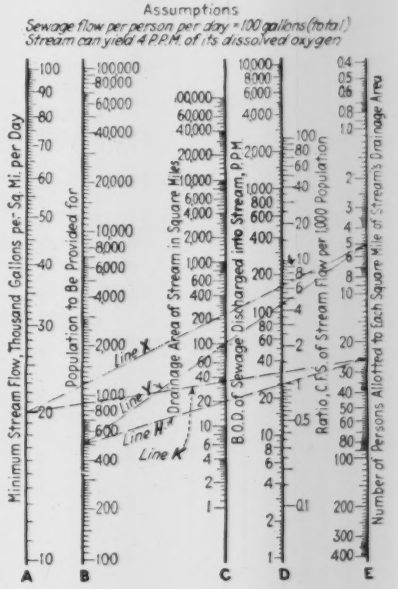
By proportion, $\frac{0.666}{0.133} = 5$. Therefore, five persons may contribute sewage per square mile of drainage area, or a total of 500 persons for the entire area.

2. If the drainage area is 20 square miles, or one-fifth of the original area, the amount of available oxygen will be correspondingly reduced and the biochemical oxygen demand of the raw sewage must be reduced to one-fifth of its initial value, or 32 p.p.m. ($\frac{1}{5}$ of 160). This indicates that certain stages of treatment are necessary.

Another solution, often used, is the method of allowing 1,000 persons to contribute untreated sewage for a predetermined number of c.f.s. of streamflow, the general range of which is 4 to 8 c.f.s. With the problem at hand we find: 20,000 gal. x 100 sq.mi. = 2,000,000 gal. of streamflow per day. This is equivalent to 3.1 c.f.s., but this figure is for only 500 persons. For 1,000 persons the necessary flow in the stream will be twice the amount, or 6.2 c.f.s.

One of these methods may be used as a check for the other. They are, however, somewhat synonymous, and the results obtained are approximately the same.

Several diagonal lines are shown to assist in the explanation of its uses. Using the same values, as in the arithmetical solution, we may proceed as follows: Connect 20,000 (line A) with 160 (line D), and project diagonal "Line X" to line E. Read 5 on this line, then


Assumptions
Sewage flow per person per day = 100 gallons (total)
Stream can yield 4 P.P.M. of its dissolved oxygen
Minimum Stream Flow, Thousand Gallons per Sq. Mi. per Day
Population to Be Provided for
Drainage Area of Stream in Square Miles
B.O.D. of Sewage Discharged into Stream, P.P.M.
Ratio, C.F.S. of Stream Flow per 1,000 Population
Number of Persons Allotted to Each Square Mile of Stream's Drainage Area
Line X
Line Y
Line H
Line K
A
B
C
D
E

RELATIONSHIP of basic data for the rapid solution of sewage-treatment problems.

connect the 5 on line E with 100 (line C) by diagonal "Line Y" and project to line B. Read that 500 persons may be served. It may also be noted that the c.f.s. value is 6.2, the same as found in the arithmetical computation.

If we have only 20 square miles, 500 population and 20,000 gal. per square mile per day—connect 500 (line B) with 20 (line C) and project to and read 25 on line E, all as shown by diagonal "Line H." Connect 25 (line E) with 20,000 (line A) and read 32 p.p.m. on line D.

In the preparation of this graph it was necessary to assign a definite value to the number of gallons of sewage contributed per person per day and to the dissolved oxygen yield of the stream, as are indicated at the top of the chart. A similar chart may be made for other values. The assumptions as shown produce results that are sufficiently accurate for general purposes and especially for preliminary surveys.

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April 2, 1936

Inadequate Spillways

IT IS NOT POSSIBLE to look at pictures of floodflows over many of the dams on rivers in the flood region without realizing that their spillways were not adequate. This is understandable if, as in the case of the Sacandaga River, the floodflows exceeded those to be expected from a so-called 1,000-year flood. But now that we know that such floods can occur, at least throughout the whole northeastern region, this insufficiency of spillway capacity should be corrected at existing dams, and new dams should have spillways designed in the light of this year's experience. Of course it is to be hoped that the 1936 flood will result in more fundamental corrective measures—the checking of floods through the construction of flood-control reservoirs. But that will require a good many years, and never will be able to do more than reduce the magnitude of the floodflow. Crest gates or sluiceways, on the other hand, can be added to existing dams within a few months' time.

Taking Off The Crest

FURTHER TESTIMONY to the value of reservoirs in taking the crest off floods is afforded by the experience on the Tennessee River, where the Chattanooga flood crest was held down by an estimated 3 ft. through the detention effect of Norris reservoir. The facts as reported in the news pages this week reinforce the showing made by the Hudson River regulating reservoir and the reservoirs on the Winooski. In all these cases the efficacy of reservoir detention proved itself strikingly, as will be clear to anyone who reflects that it is the top few feet of flood that do the most damage. At the same time it should be noted that such flood reductions affect chiefly the upper reaches of the streams, and that the effect on the main river will rarely be perceptible. Before we can accomplish much flood control of large rivers by headwater reservoirs a prodigious number of such storages must be constructed. The time necessary for these is likely to be measured in generations rather than in years, and until then the major rivers will have to be controlled largely by channel improvement and other local protective works.

Not So Simple

AS WAS TO BE EXPECTED, many flood-control bills are being introduced in Congress, most of them carrying huge appropriations. These appropriations can do no good, of course, in the absence of plans. With very few exceptions, no large river has been studied to see whether control of its floods is really practicable, and if so what kind of control it ought to have. Where alternative methods of control are known to be possible—and they almost always are possible—their comparative values have not been investigated. The extent to which floodwaters can be held back in the hills, and the extent to which channels through valley and plain need to be cleared, are vital points that must be determined before the first spade is struck into the ground. Also, the division of benefits and costs must be appraised in order to make work possible at all. The whole matter is not so simple as the appropriation bills would suggest, and no money ought to be appropriated at this time for flood-control works. Instead, Congress will do a truly constructive thing if it initiates full studies and surveys and lays down a policy for national and local cooperation that can be applied anywhere in the country and will be fair to all interests concerned.

Construction Makes Good

THE FLORIDA CANAL, despite its offhand beginning under a shadow of economic doubt, has a spectacular interest as a construction task. No canal and, in fact, no single operation of earth-moving for any purpose even approaches the 570,000,000 cu.yd. of excavation required to complete the impulse-dictated ship channel "to wed Atlantic and Gulf tides." As stated on another page, excavation was begun with remarkable promptitude and has progressed with exceptional speed; modern machinery has enabled the contractors to obtain volume even under the handicap of some hundreds of sweepers and kindling-splitters forced under their care by the dictates of a Works Progress Administration. As an example of earth-moving efficiency and ingenious application of modern excavating and conveying equipment, the Florida canal presents nothing for which engineers and contractors need apologize. It can be stated from personal knowledge that the great volume of underwater excavation yet to come has been as well-planned and as modernly mechanized. Engineering has accomplished its task well in beginning the Florida canal; it can do no more until Congress decides that construction shall continue. As of the present outlook, construction of the Atlantic-Gulf ship canal will end this summer with some nice construction camps built and one-fortieth of the excavation completed.

Underground Unknowns

IF ANYTHING WERE NEEDED to counsel never-ending caution in hydraulic work over limestone suspected of cavern formation, Farley Gannett's lively account of trouble at the Ontelaunee dam would provide it. The experience of watching a dam embankment crumbling in the vortex of water flowing down a pothole into subterranean passages is something no one would willingly repeat. It is particularly disheartening when foundation grouting has been done on close spacing, and apparently to sufficient depth, and yet in the light of events a large cavern belt has been missed. Fortunately the remedial work at Ontelaunee was successful. Deeper grouting and test-hole drilling, coupled with higher pressures than commonly used, are likely to be profitable investments in any case that involves reasonable chance of cavern formation. No doubt the best course is to avoid dam sites affected by such weakness, even at the cost of adopting a less desirable supply; the least that can be done is to debit every site with the cost of full precautionary work before deciding which of alternative sites is economically profitable. But it may often happen that a site subject to cavern formation cannot be avoided. In such case it is well worth considering whether modified dam types can be devised that will be secure against failure even when an undiscovered channel in the rock is broken through. The ordinary earth embankment is apt to be uncomfortably vulnerable to such accidents.

There Always Will Be Floods

THE NATION is being told by many special pleaders that floods such as the northeastern states experienced in March can be completely eliminated. The soil conservationists claim that contour plowing and the planting of proper cover crops will hold back the water until it sinks into the soil. Newspaper experts claim that the whole problem can be solved by building small dams at the headwaters of all our rivers. Such claims can serve only to deceive the public.

We do not mean to say that both proper cultivation of the land and the construction of flood detention reservoirs will not help to reduce the magnitude of future floods. They will, and detention reservoirs most strongly so. But they will only reduce, not eliminate.

In theory it is possible to eliminate many floods. It has been done on a few small rivers in unsettled regions. But as a practical matter it cannot be done on large rivers in settled country. For one thing the necessary flood detention reservoirs, if sites can be found, would have to be built in occupied valley, where they would drown out some communities in an effort to provide complete protection for those below. For another thing, most rivers afford no dam sites in their lower reaches, where storage or detention is most vital. In other valleys the cost of suitable reservoirs would be prohibitive.

On most rivers the only feasible reservoirs are those on the headwaters. They will take care only of floodwaters coming from the regions above. But if the main river valley is wide with many small tributaries and few possible reservoir sites in the lower reaches, which is generally the case, a widespread rainstorm coming upon deep snow lying on frozen ground will result in a concentrated runoff from all the small streams in the main valley that will cause highwater even though the reservoirs are fully effective.

Take the Missouri, for example. The federal government is engaged in building a great storage reservoir at Fort Peck, Mont., at a cost of $84,000,000. Its purpose is flood control as well as navigation improvement. Were it intended for flood control alone it would cost about $29,000,000, and the army engineers have estimated that it would lower flood crests near Kansas City only about one foot in a major flood, like that of 1908. Why? Because the runoff that causes such floods comes from the lower valley. Construction of three other feasible reservoirs in the lower part of the valley would make possible a further lowering of the flood crest, but even so would not eliminate floods entirely. And, incidentally, had the four reservoirs been in service during the 1927 flood on the Mississippi River they would have reduced its flood crest at Cairo, Ill., *less than one foot*—and they would have cost no less than $125,000,000!

In planning protection against future floods these limitations need to be recognized if mistakes are to be avoided. True it is that headwater reservoirs should be built wherever possible, because they not only will reduce the flood crest but also will add to the low flow in summer, which is desirable for many reasons. But headwater reservoirs solve only part of the problem; the other and equally important factor is for each community on rivers subject to flooding to define the areas that will be subject to overflow until detention reservoirs are built and then take steps to move essential community services out of these areas or protect those that cannot be moved.

No new buildings should be built in areas set aside as necessary to carry flood flows past a city, and those now in the flood channels should be moved out as rapidly as is economically possible. If any low areas subject to overflow are not needed as flood channels, they should be protected against submergence by dikes or by raising the level of the land. The restrictions affecting these areas should be clearly set forth in zoning laws, to prevent unwitting encroachment upon flood channels or innocent construction on land subject to frequent overflow. If economic considerations make a location in the flood area desirable for an industrial plant the site must be chosen in full knowledge of the risk involved, but in no instance should such structures as oil tanks be built in areas where they may become a source of potential danger in a flood.

If precautions of this nature are taken future floods may cause some inconvenience but should result in no loss of life and little property damage. The all-important thing to remember at this time is that there always will be floods, and that some of them will be great floods.

They Met the Emergency

THE STORY of the devastating floods that swept the northeastern states two weeks ago would not be complete without a tribute to those who so admirably took part in rescue and relief work and in the restoration of vital services. First came the immediate needs, met by the police and fire departments, veteran organizations and that new agency of mercy in disaster—the radio broadcasting station. Swiftly after the waters struck came the Red Cross, the Salvation Army, the national guard and state police to care for the refugees and to restore a semblance of order.

Outstanding, and often heroic, was the work of the various engineering departments—of the cities and towns, of state highway departments, of waterworks, of power, railroad, gas, telegraph and telephone companies. They fought hard, often in vain, to keep intact those services so vital to human needs: power, light, water, communication and transportation. Where these services failed men worked unceasingly, driven as only disaster can drive the human machine, to install emergency replacements. Then, as rapidly as possible, permanent restoration was made.

Where disease threatened to follow in the wake of the floodwaters, as it does only too often, local, state and federal health authorities met the situation with stern but sensible measures. As a result the absence of disease, even under most appallingly bad sanitary conditions, was remarkable and without precedence.

Then came the cleanup. Tens of thousands of WPA, CCC, city and state forces were mobilized into shovel armies to attack the seemingly hopeless task of cleaning up thousands of acres of sodden wreckage, mud and slime. Relief workers, used to short working days and easy schedules, when transported to stricken areas suddenly became fired with a zeal of service to suffering humanity and worked like mad. Hours of work were forgotten, and "security" wages meant nothing to them.

The engineering reporter who followed close on the flood's crest encountered many a hero whom the world will never know. He was the haggard, unshaven, mud-bespattered worker, engineer or official who had gone without sleep for days, toiling to relieve the suffering of a devastated community. Though the world may never know his name, it will know the results of his work—the saving of life, the prevention of pestilence, and speedy recovery from disaster.

CURRENT NEWS

Surety Case Decided By Supreme Court

Subcontractor on Tennessee bridge wins decision as part of state law is declared unconstitutional

DECLARING that a section of the laws of Tennessee violated the contract clause of the Constitution, the U. S. Supreme Court reversed the decision of the Supreme Court of Tennessee in the case of the International Steel & Iron Co. against the National Surety Co., and on March 30 remanded the case for further proceedings.

The case arose out of a question of the application of the surety company under a law amended in 1929, as it applied to a contract for a bridge started in 1928. International Steel & Iron Co. was sub-contractor for the National Construction Co., builder of the bridge. The state law at that time required that the contractor furnish a bond to protect the state and to secure payment to persons furnishing materials, supplies and labor for the project. The National Construction Co. executed such a bond with the National Surety Co. On completion of the work, the subcontractor claimed a balance of about $59,000, and there remained in the possession of the highway department about $77,000 which had been retained out of the contract price as directed by the state law.

In the meantime, the act had been amended, 1929, to provide that, instead of withholding the retained percentage pending the presentation of claims by subcontractors, and paying into court so much as might be necessary to answer suits brought on those claims, the Commissioner of Highways might, upon the date of final settlement, release and pay to the principal contractor the amount retained, against a refunding bond with proper surety, conditioned for the payment of claims of subcontractors. Under this amendatory act, the commissioner made final settlement with the construction company and paid it the retained percentage, taking a refunding bond with the Equitable Casualty and Surety Co. as surety. The International Steel & Iron Co. then filed a bill in the chancery court against the construction company, the National Surety Co., the commissioner and the Equitable Casualty and Surety Co., asking a decree for the balance due under its contract. The National Surety Co. asserted that the payment of the retained percentage and the acceptance of a refunding bond released it as surety from liability to the Department of Highways or to subcontractors.

A decree was entered in favor of the commissioner against the construction company and the Equitable company on the refunding bond.

Subsequently the commissioner informed the court that the Equitable company had become insolvent and it was proposed to substitute a refunding bond of the construction company as principal and the Consolidated Indemnity & Insurance Co. as surety. The chancery court later found in favor of the International Steel & Iron Co. for a balance of about $58,000. The National Surety Co. then took the case to the state court of appeals which reversed the chancery court decision.

The case was then taken to the supreme court of the state which affirmed the decree of the court of appeals, though upon different grounds. The state supreme court held the amendatory act retroactive and applicable to the contract of the construction company and found that the commissioner's action was lawful and effective to supersede and annul the contract bond. The court also said that its conception of the Act of 1929 did not bring that statute into any constitutional difficulty. The case was later reargued after a brief had been filed raising federal constitutional questions under Article 1, Section 10. The state court then held that the act did not impair the obligation of contracts in violation of the contract clause of the Constitution.

The U. S. Supreme Court found that the amended act of 1929 released and discharged the obligation of the bond and substituted therefor the obligation of another bond without the acquiescence of the subcontractor. This was held not to substitute a new for the old remedy against the surety, but declared the surety obligation unenforceable and it was found, therefore, that the statute violated the contract laws of the Constitution.

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House Committee Amends Federal-Aid Highway Bill

Several new features are included in the federal-aid highway bill as amended in the House Committee on Post Offices and Post Roads prior to reporting this legislation to the House. A section intended primarily to meet the situation existing in Arkansas provides that states in which the average tax per motor vehicle already is as high or higher than the national average need not match all or any portion of their federal-aid highway allotment that their revenues fail to cover after defraying costs incident to bond retirement and other highway purposes, other than construction.

The term "highway" as defined in the Federal Highway Act of 1921 is amended to include as part of the federal-aid system such main parkways as may be designated by the state and approved by the Bureau of Public Roads.

All sums apportioned among the states will remain available for expenditures for one year after the close of the fiscal year for which they are authorized and any sums remaining unexpended at the end of that period are to be reapportioned.

As reported in *ENR*, March 12, the bill carries an authorization of $125,000,000 for each of the fiscal years 1938 and 1939 and, in addition authorizes $25,000,000 for secondary and feeder roads in each year to be matched by the states, also $50,000,000 for grade-crossing elimination in each year, which does not have to be matched.

TVA Report Goes to Congress

Three new dams and additional storage reservoirs recommended by Tennessee Valley Authority in progress report

PLANS for the unified development of a navigation and flood control program for the Tennessee River watershed, an area embracing more than 40,000 square miles, and a report of its progress, prepared at the request of Congress, was submitted by the Tennessee Valley Authority on March 30.

Three dams in the main river, in addition to five the TVA is now building together with storage reservoirs in the tributaries, are recommended for construction to five the TVA is now bulding, to plan for the integrated development of the Tennessee Valley watershed. Completion of works and program directed by Congress to date will require a total expenditure of $185,188,525. Of this total, Congress has appropriated $111,000,000 to carry the program through June 30, 1936.

New projects would be at Gilbertsville, Ky., Watts Bar (White Creek), Tenn., and Coulter Shoals, Tenn. The first would deepen the lower stretches of the Tennessee River, while the other two would extend the 9-ft. channel to Knoxville as directed by Congress. Meanwhile, Pickwick Landing, Wheeler, Guntersville and Chickamauga dams, now under construction, together with Wilson Dam and the privately owned Hales Bar dam, will insure a series of navigation lakes for some 330 miles, or about half of the total navigation distance.

Flood control benefits

Flood control benefits of the completed unified plan are indicated in the report in terms of the Mississippi flood of 1927. During that flood, the report states, the Tennessee River was contributing from 14 to 20 per cent of the flood peak of the Mississippi. The system of main river and tributary dams in the Tennessee River watershed would have reduced the crest of the Mississippi flood by two or three feet. In addition, the report states, flood hazards in the Tennessee River basin would have been reduced as well.

It is pointed out that only through the use of high dams in providing a navigation channel can flood control be obtained. Through the construction of these high dams, potential water power is created, which, when transformed into electrical energy, can be sold to liquidate the cost of the improvements. The control of flood waters requires not only artificial work such as dams in the rivers themselves, but also an extensive land program to provide natural storage by means of sods, planting of legumes, and reforestation. It is explained that if four more inches of rainfall each year could be absorbed on only one-half of the Tennessee Valley area, a

water storage capacity would be created equal to that of Norris Dam reservoir.

Land improvement work

The need for an extensive land program to prevent silting of reservoirs and river channels is illustrated by the fact that the reservoir created by Hales Bar Dam, near Chattanooga, Tenn., has lost one-third of its storage capacity in the 23 years since its completion. Under direction of the extension services of the land grant colleges in the area, this program of restoration of natural water storage in the soil is pushing ahead rapidly and resulting in a better farm management and more fertile soil.

The key element in the soil rehabilitation program is phosphorus. Experiments and demonstrations in lowering the cost of this plant food are being undertaken at the nitrate plant at Muscle Shoals. Electric power generated at Wilson Dam is being used in the processes.

General recommendations

The report emphasizes the economies of construction resulting from an integrated and progressive works program in river development. Workmen, trained for key positions, and equipment can be moved from place to place as the work progresses, with a consequent saving in costs.

In addition to Norris Dam on the Clinch River, now completed, and the dam at Fowler Bend, N. C., on the Hiwassee River, authorized by Congress last year, the Authority recommends construction of a third tributary storage dam, to be built on the Little Tennessee River at Fontana, N. C.

A conservation program through such unified control, would provide a river highway to tap the natural resources of the Tennessee Valley and at the same time, protect the basin against destructive floods. Also the plan would insure two feet of additional safety for flood levees on the lower Mississippi River. Incidental power generation would reimburse the national treasury in whole or in part for these navigation and flood control investments.

Despite undeveloped navigation facilities, 2,800,000 tons of freight have been moved in a single year on the Tennessee River. With improvements, according to War Department estimates, about 17,800,000 tons should be moving by 1950.

The recommendations made to Congress take into consideration the economic development of the Tennessee Valley on the basis of an improved river system. Consideration is also given to the establishment of river terminals, and the coordination of the Tennessee River system with possible development of the Cumberland, Tombigbee and Warrior rivers.

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Many Engineers Seek License From New York State Board

A total of 500 candidates took the January written examinations under the engineers' registration law in New York state. Of these men, 89 were conditioned, 25 failed, and 386 passed.

At the February meeting of the board of examiners, 169 applications were considered. Of these, 12 were held for interview, 53 were scheduled for written examination, 47 were rejected, and 57 were approved for license.

Flood Control Occupies Congress

Omnibus flood control bill extended to include reservoir systems on eastern rivers as Congress considers measures—Numerous appropriations for rehabilitation and future control discussed—Rehabilitation Administration proposed

Washington Correspondence

INSPIRED by the deluge of waters which has stricken the eastern part of the United States, a secondary deluge of bills providing for emergency relief, rehabilitation loans and permanent flood control measures in the affected districts has struck both houses of Congress. These range from a blanket appropriation of $1,000,000,000 "or more, if necessary" to be used by the President for general relief and rehabilitation loans at 1 per cent interest down to mere directions that the army engineers make preliminary examinations of flood control plans for a score or more rivers, large and small, that have recently been on the rampage.

Omnibus bill considered

Meanwhile the long-neglected omnibus flood control measure, passed by the House last session and recommitted to the Senate Commerce Committee for pruning after its total had been boosted from $350,000,000 to more than $750,000,000 in the Senate, has undergone a general revision resulting in the elimination of many doubtful projects and the inclusion of several new additions in the East, notably on the Merrimack and Connecticut rivers, and in upstate New York and Pennsylvania.

The present total of $315,000,000 will probably be raised before the committee reports the bill. It now includes reservoir systems for the Merrimack and Connecticut Rivers also extensive programs for both the Susquehanna and Allegheny-Monongahela-Ohio systems. Many projects in the South and West have been taken out of the bill to bring down total, but it is doubtful that they can all be kept out. Preliminary sections of the bill declare that floods menace the national welfare, and that, therefore, control is a proper function of the federal government especially when the solution is complicated by need for cooperation among local governments. It is possible that the pending Overton bill providing $272,000,000 for a Mississippi valley control program may be added to the omnibus measure.

Of the several bills providing for immediate relief of flood sufferers, it is doubtful if any get beyond the committees to which they have been referred. The job is being done by the Red Cross, the CCC, and the WPA, and by the time Congress gets around to actual consideration of the measures the need for emergency relief will be passed.

Reconstruction agency proposed

Rehabilitation, however, is a different proposition. Home owners and small business men faced with the necessity of rebuilding will require credit, and some form of government aid will very probably be provided for them, as well as for municipalities. Senator Davis has proposed creation of a Flood Rehabilitation Administration, to combine the efforts of existing agencies such as the Federal land banks, the HOLC, the Resettlement Administratin and the FERA. Ten-year loans would be provided for private property owners; twenty-year loans for utilities and municipalities.

A more popular proposal is a liberalization of RFC regulations, especially in regard to the security required for loans. Four separate, but similar, measures have been introduced for this purpose, of which two have already received favorable reports by the House Banking and Currency Committee. All bills would permit RFC to advance up to $25,000,000 in direct loans to individuals and corporations for the repair, construction, reconstruction, rehabilitation and acquisition of real and personal property in regions affected by catastrophes such as flood, windstorm, conflagration or dust storm. Previous disaster loans have been handled through intermediatory nonprofit corporations; the elimination of this provision is expected to expedite rehabilitation work. Other changes to simplify and speed up the distribution of federal funds are included. Efforts are being made to expedite consideration of this legislation and it is probably that a bill will pass shortly.

Other flood-inspired bills include a proposal to create a Missouri Valley Authority along the pattern of TVA and Senator Norris' proposed Mississippi Valley Authority, upon which a committee is now holding public hearings. Individual bills introduced include preliminary flood control surveys for the Passaic, Kennebec, Penobscot, Androscoggin and Pawtuxet rivers and for eleven creeks tributary to the San Joaquin River in California, and authorizations for flood control works on the following rivers: Delaware ($30,000,000); Ohio above Pittsburgh ($55,215,000); Susquehanna ($13,363,500); Youghiogheny ($19,500,000); Lackawanna ($250,000); and Hoosac ($150,000).

PWA state directors are submitting, in response to instructions, estimates of flood damage to public porperty where PWA financing of replacements and repairs would be appropriate.

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Housing Projects Planned Under Insured Mortgages

Commitments have been issued on a large scale housing project at Wilmington, Del., to be developed by the Wilmington Housing Corp. in conjunction with the Federal Housing Administration at a cost of $638,200. The New York Life Insurance Co. will take an insured 4½ per cent mortgage for $510,000 to be amortized over a period of 30 years. Known as the Park View Apartments, the project will provide 168 family dwelling units at rentals averaging $14.50 per room. Construction is expected to begin in 30 days. Coincident with announcement of the new project, FHA reported that plans had been consummated for the $1,012,000 Meadville, Pa., project, comprising 202 houses and 173 garages, to rent at an average of $7 to $8 a room. The Pennsylvania State Workmen's insurance board will take up the $800,000 4½ per cent, 30-year mortgage.

Specifications Announced for Cotton Mats and Fabrics

To facilitate bidding on the cotton mats and cotton fabric to be used in the program to promote the use of cotton in road building, the Agricultural Adjustment Administration has announced the detailed specifications and conditions of purchase. The program authorizes the purchase of about 80,000 cotton mats and sufficient fabric for a total of 1,000 miles of roads (*ENR*, March 19, p. 435). Forms on which the states are to make their requests are now going to the various state highway commissions. The amounts actually purchased will depend upon the requests to be made by the states before May 1. Bids will be accepted on the basis of the lowest total cost to the government, including shipping charges to the point of delivery.

Cotton mats to be used for curing concrete pavements shall have a covering 40 in. wide, weighing not less than 7 oz. per yard and known as "osnaburg," with not less than 32 threads in warp and 28 threads in filling, having a minimum average breaking strength of 60 lb. in the warp and 60 lb. in the filling. The filling material for the mat shall be cotton bats made of raw cotton weighing not less than 12 oz. per sq.yd. The grade of cotton used for this purpose shall not be lower than "good ordinary." Mats of standard dimensions shall have a filler 5 ft. 9 in. in width and shall have a flap approximately 6 in. in width. Mats of standard dimensions shall be 22 ft. 6 in. long. For curing roads of a width other than 20 ft. and for curing half widths, mats of different length will be needed. In all cases the length of the mats shall be 2 ft. 6 in. greater than the width of the pavement to be cured.

The covering material for each surface of the mat shall consist of two widths of cloth and the cotton filling material shall be held in place between the covering by sewing or tufting all around the edge of the mat and by sewing or quilting longitudinally at intervals not greater than 4 in., or by tufting at intervals not greater than 3 in.

Tolerances of 1 per cent of the specified length and 2 per cent of the specified width will be allowed. The weight of the osnaburg covering cloth shall not fall below the specified weight by more than 5 per cent.

Reinforcing fabric

The fabric for use in bituminous surface treatments shall be free from avoidable imperfections and shall be made of raw cotton grown and manufactured in the United States. The yarn shall be of two-ply with a balanced twist and no sizing shall be applied to the yarn. The weave of the cloth shall be plain and no sizing shall be applied to the fabric. Fabric shall be supplied in rolls consisting of a cut not shorter than 40 yards nor longer than 120 yards.

The thread count, weight, width and breaking strength of the various types of fabrics shall be as follows for each of the three grades which may be supplied in one of the following widths: 90, 82 and 74 in. Type A fabric shall weigh 5.3 oz. per sq.yd. and shall have a thread count of 12 per in. in both warp and filling and minimum average breaking strength for both warp and filling shall be 45 lb. Type B shall weigh 4.25 oz. per sq.yd. and shall have a thread count of 9 with a minimum average breaking strength of 35. Type C shall weigh 3.2 oz. per sq.yd. and shall have a thread count of 7 and a minimum average breaking strength of 25 lb.

The following tolerances will be allowed: a tolerance of plus or minus 1 inch in the width specified; the combined strength of the warp and filling in the fabric shall equal or exceed the combined strength of those given above and neither shall be more than 10 per cent under the requirements; a tolerance of plus or minus 5 per cent shall be permitted in weight.

THE BAY BRIDGE TAKES SHAPE

With cable spinning on the two suspension bridges completed and floor steel and stiffening truss erection under way and with the 1,400-ft. cantilever span beyond the island closed, the 8-mile long bridge connecting San Francisco and Oakland will soon present a completed appearance. As it is pictured above, the project is 75 per cent finished.

Delaware River Tunnel Plans Approved

Application by the Delaware River Tunnel Corp., Philadelphia, Pa., for approval of plans for a vehicle tunnel under the Delaware River between Mantua Creek, N. J., and Hog Island, Pa., received approval by the Secretary of War on March 24.

At the public hearing for consideration of the application, held on Oct. 30, 1935, objections were made to the plans on the grounds that the proposed method of construction would obstruct navigation and interfere with the anchorage of vessels and that the depths proposed were inadequate. On Feb. 11, 1936, the conference was held at which the tunnel corporation presented plans designed to provide adequately for the needs of navigation during the construction of the tunnel. Subsequently, the applicant revised plans to provide a depth over the actual tunnel structure of 53 ft. for a channel width of 1,600 ft. Present project depth on the Delaware River is 35 ft., the proposed depth of 53 ft. being considered adequate for the prospective demands of navigation.

Building Trades Unions Ratify Arbitration Plan

Peace has come to the Building Trades Department of the American Federation of Labor after eighteen months of conflict between two rival groups led by J. W. Williams of the carpenters union and M. J. McDonough, of the plumbers union.

The pact ratified by seventeen of the nineteen Building Trades Unions provides for a form of enforced arbitration. Disputes over jurisdictional questions are to be submitted to an arbiter, by preference a federal judge, and his ruling shall be binding.

Definite limitations are imposed by the agreement. No old ruling shall be reopened, and pending the final decision, which is to be given when possible within ten days, mechanics on the job shall continue at work. Hearings are to be held when called by the arbiter, at which both sides shall be given ample opportunity to present their claims. Claimants who fail to appear at such hearings shall be eliminated.

In the reorganization of the Building Trades Department of the Federation J. W. Williams, has been named president of the council, while M. J. McDonough has been named secretary-treasurer.

Allegheny River Cuts New Channel Around Braeburn Dam

During the flood of two weeks ago the Allegheny River broke through around the west abutment of Dam No. 4, at Braeburn, Pa., and cut a new channel through which the entire river flowed for several days threatening the plant of the Braeburn Steel Co., the village and the tracks of the Pittsburgh-Buffalo line of the Pennsylvania Railroad. At first the cut was only 200 ft. wide, but the rushing waters gradually widened the breach to a triangular cut 500 x 2,000 ft. Thousands of sandbags and hundreds of carloads of rock were dumped into the break by forces of the railroad and the U. S. Engineer Department in an effort to prevent further washing. Six old locomotives were rushed to the site to be pushed over the bank as a last resort to stem further washing out of the railroad embankment. The river was brought under control, however, before the locomotives were required.

Plans are now under way to build a stone dike across the upper end of the break to divert the river back over the dam, and to then fill in the washed out area. The break occurred at the end of the dam opposite the locks. The dam, of the fixed type, is a concrete structure, completed in 1933. The fight to control the river was carried on under the direction of Major W. D. Styer, U. S. District Engineer, and W. B. Wood, Chief Engineer, Central Region, Pennsylvania Railroad.

Emsworth locks damaged

The lower gates of the larger of the two double locks at Emsworth Dam, on the Ohio River just below Pittsburgh, were carried away by the flood. One leaf is gone entirely, the other is a twisted mass of wreckage hanging from the hinges. The dam at this point is under the process of raising, and considerable damage is reported to the contractor's equipment. One large traveling crane was wrecked.

Bids on Ventilating Building For Midtown Tunnel Received

Four bids on the New Jersey ventilating building for the Midtown Tunnel under the Hudson River at New York were received when the bids were opened on March 31. The bids were as follows: George Siegler Co., Jersey City, $526,516; Cauldwell-Wingate Co., New York, $543,347; Millimet Construction Co., Union City, N. J., $554,700; James Mitchell, Inc., Jersey City, $567,000. The building is to be 145 ft. high above the substructure which was built under an earlier contract. The substructure extends down to bedrock below the tunnel level, about 60 ft. The ventilating fans and related equipment are not included in the present work, which is scheduled to be completed by Dec. 1.

SOCIETY CALENDAR

AMERICAN ROAD BUILDERS ASSOCIATION, annual business meeting, Washington, D. C., April 15-17.

FEDERATION OF ARCHITECTS, ENGINEERS, CHEMISTS AND TECHNICIANS, annual convention, Rochester, N. Y., April 17-19.

CONCRETE REINFORCING STEEL INSTITUTE, annual meeting, Hot Springs, Va., April 20-22.

MIDWEST POWER ENGINEERING CONFERENCE, Chicago, Ill., April 20-24.

AMERICAN SOCIETY OF CIVIL ENGINEERS, spring meeting, Hot Springs, Ark., April 22-24.

NATIONAL LUMBER MANUFACTURERS ASSOCIATION, annual meeting, Chicago, Ill., April 23-25.

AMERICAN WATER WORKS ASSOCIATION, annual meeting, Los Angeles, Calif., June 8-12.

SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION, annual meeting, Madison, Wis., June 23-26.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

PUBLIC WORKS CONGRESS, joint meeting, AMERICAN SOCIETY OF MUNICIPAL ENGINEERS AND INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, Toronto, Ont., September 28-30.

ENGINEERS CLUB OF THE LEHIGH VALLEY, Bethlehem, Pa., April 13. Joseph B. Eastman will speak on transportation.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, Lafayette, Ind., April 7-9.

ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Evanston, Ill., April 10-11.

NEW ENGLAND BUILDING OFFICIALS CONFERENCE, annual meeting, Boston, Mass., April 20-22.

IOWA ENGINEERING SOCIETY has elected the following officers for 1936-37: President, QUINCY C. AYRES; vice-presidents, T. R. AGG and A. A. BAUSTIAN. DEAN ANSON MARSTON was elected as an honorary member.

NEW YORK COUNTY CHAPTER, NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS, has elected the following officers for 1936-1937: President, J. W. PICKWORTH; vice-presidents, E. A. KINGSLEY, MAURICE DEUTSCH, F. E. SCHMITT, G. A. SALLENS, M. N. NIXEN-MILLER; treasurer-financial secretary, W. H. YATES.

ASPHALT INSTITUTE has elected the following officers for the year beginning April 1: President, B. L. BOYE; vice-president, J. A. BLOOD, L. M. SHAW, T. M. MARTIN, A. M. MAXWELL; treasurer, HERBERT SPENCER; secretary, J. J. GARTLAND.

THE CONNECTICUT SOCIETY OF CIVIL ENGINEERS, at a recent meeting elected the following officers for 1936: President, BENJAMIN H. PALMER, JR.; vice-presidents, ARTHUR W. BUSHELL, ELWOOD T. NETTLETON; secretary-treasurer, H. JACKSON TIPPET. Directors are W. HOWARD SHARP, JOSEPH D. BROWN, HENRY W. BUCK, DANIEL H. B. STARR, CHARLES R. HART, ORSON H. MARCHANT, CALVIN L. BARTON and GEORGE E. SMITH.

BLASTING OUT A COFFERDAM AT BONNEVILLE

About two tons of dynamite were used in this shot which blasted away two sections of the upstream rock-filled crib cofferdam on the Bradford Island side of the main channel of the Columbia River where Bonneville Dam is being built. One-half of the work on the base and piers for the main spillway dam has been completed and the cofferdam is being removed to allow room for work on the other section. After the rest of the horseshoe-shaped cofferdam has been removed by blasting or other means, the project will be ready for the second half of the main dam, extending out from the Washington shore shown in the background.

Harrisburg Water Supply Restored to Service

The municipal water supply system of Harrisburg, Pa., which was put out of service for eight days by the flood of the Susquehanna River on Mar. 18-19, is now working, though operations are far from normal. The supply is from the river, and service failed at 10 p.m., Mar. 18, when the pumping station, located on the Harrisburg shore of the river, was drowned out. The filter plant, situated on an island in midstream, went out when waters overtopped a protecting dike about 3 p.m., Mar. 19. The dike was topped only 4 in. by the crest of the flood. When the pumping plant failed there was only a storage of 35,000,000 gal. in the reservoirs.

Stringent restrictions cut the normal demand of 12 m.g.d. down to 5 m.g.d. Three private water companies and a municipal supply of neighboring towns helped to keep the reservoirs from being entirely emptied, though there was less than 5,000,000 gal. in storage when pumping was resumed. The Rutherford Water Co. furnished 1 m.g.d.; the Dauphin Consolidated Water Co. furnished 1.5 m.g.d.; the Riverton Consolidated Water Co. supplied 500,000 gal. daily, and the village of Steelton diverted 200,000 gal. daily from its municipal system into the Harrisburg lines. For several days a fleet of tank trucks hauled water from Lemoyne to the city reservoirs. Three engineers from the firm of Gannett, Eastman & Fleming, consulting engineers of Harrisburg, worked with city officials in restoration of service. Studies are now under way to determine if the present pumping plant and filters should be moved or if adequate protection against recurring floods is possible with the plants in their present locations.

Report Indicates Need For Irrigation Subsidies

An indication that subsidies may be necessary to make many future irrigation and drainage projects acceptable from an economic standpoint is found in the first national inventory of land which might be reclaimed for agriculture by irrigation or drainage. The report, which has been completed for the National Resources Committee by the Bureau of Agricultural Engineering, indicates that there remain about 100,000,000 acres which could be adapted to agriculture by drainage and more than 30,000,000 acres which could be reclaimed by irrigation. This report is part of the Supplementary Land Report which will appear in eleven parts when complete. This total of potentially arable land is about 27,000,000 acres greater than the area now improved by irrigation or drainage. Recent figures show about 19,000,000 acres in the present irrigated areas and about 84,000,000 acres in enterprises organized to effect drainage. Of the 84,000,000 acres in organized drainage enterprises, 65,500,000 acres are improved lands.

Utilizing swamp land

Based on the study of drainage areas, the report finds that there are over 20,000,000 acres of unimproved lands in organized drainage enterprises. These lands hamper the progress of the drainage districts because they cannot support their proportionate share of maintenance expenses, and in some cases it would be desirable to abandon uneconomical enterprises which contain large areas of unimproved lands. The possibility of utilizing swamp and wet lands as bird and game refuges or public shooting grounds, for raising fur-bearing animals, or for recrea-

SUBWAY THROUGH MISSISSIPPI RIVER LEVEE

This subway on State Highway No. 4 near Madison, Ill., necessary for the elimination of a grade crossing with an electrified railroad, was made by cutting through a levee used in the control of the flood waters of the Mississippi River. As the levee board required the maintaining of an unbroken levee line there arose a problem of designing an adequate method of closing the roadway and making it waterproof. Consequently, swinging gates which could be closed at flood stages are being used.

When open, the gates are swung into niches in the abutment. The picture shows the right gate and the sidewalk gate closed, with the left gate slightly started away from the abutment. During high water stages the gates are closed and sand bags piled at the bottom of the gates to prevent water seepage through the half-inch space left for clearance.

The house on the right contains an automatic pump providing drainage for the low point under the structure. The subway is located over a 27-ft. sump into which water is drained.

Richardson Construction Co. was the contractor on the subway structure, while Keeley Brothers built the grade and pavement. The work was done under Ernst Lieberman, chief highway engineer, and C. M. Hathaway, chief construction engineer. The resident engineers on the project were H. V. McCoy and E. W. Dull.

tional purposes, rather than for agricultural use, should be given careful consideration.

That a study should be made of drainage legislation with a view to improving the organization and legislative procedure so that drainage overhead expenses will be decreased and more adequate drainage can be secured by the farmer was also recommended.

Commenting on irrigation conditions in seventeen western states the report shows that crop agriculture of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming is usually considered in terms of irrigation, although there are scattered areas of grain and forage crops, large in total, that are watered by natural precipitation alone. The coast states of California, Oregon, and Washington have zones west of the Coast and Cascade Mountains where irrigation is merely supplementary to natural precipitation, although the increases in yields which may be brought about by irrigation are awakening a wider interest in irrigation supplies for use in the drier months.

East of the Coast Range in California and east of the Cascades in Oregon and Washington irrigation is thought of in the same terms as in the Mountain States listed as wholly dependent upon irrigation.

Of the area under present irrigation, the report says a very large portion was supplied with water at costs of less than $50 per acre and very little of it exceeded $100 per acre. However, it is noticeable that but little of the future development is possible at a charge of less than $50 per acre for water. It is quite likely that, for many projects, the costs indicated in excess of $50 per acre will always be more than the lands can economically support. This, according to the report, means that some form of subsidy will be necessary to make many of the projects of the future acceptable from an economic standpoint.

Illinois Canneries Ordered To Stop Stream Pollution

Cannery companies of Chenoa, El Paso, Hampshire and LeRoy, Ill., were ordered by the State Sanitary Water Board after hearings held March 23 in Chicago to abandon the pollution of local streams with waste products. This announcement was made by Dr. Frank J. Jirka, state health director and chairman of the board, who said that representatives of the cannery concerns had been requested to make the necessary improvements prior to June first of this year.

Waste products from canneries when emptied into streams destroy fish life and make the waterways undesirable for recreation purposes, Dr. Jirka said. The action of the board yesterday was timed ahead of the approaching canning season so that the pollution abatement orders will be effective during the coming fishing and outdoor season.

Representatives of five cannery concerns were asked to submit plans for the necessary improvements to the State Department of Public Health for approval.

Wisconsin Security Program Calls for Sanitary Engineers

To carry out the social security combined state and federal program in Wisconsin the state has been divided into nine sanitary districts with a doctor in charge of each. The object is to supplement and extend the program now being carried out by the State Board of Health. Each district agency will be staffed with a physician, a sanitary engineer, a nurse and a clerk-stenographer. Under this program, which is to be supported by the federal government, nine additional sanitary engineers are to be taken on. L. F. Warrick, state sanitary engineer, states that these engineers are to care for routine compaints and requests for services as well as follow-up activities on certain phases of the work conducted by the bureau of sanitary engineering, including water supply, sewage disposal, industrial waste treatment, pollution surveys and other state departmental activities.

The U. S. Public Health Service has been allotted $8,000,000 to assist the states under the Social Security Act. Large portions of this money will have to be concentrated in areas with special health problems. The funds are to be used in strengthening state health departments and for aiding cities and counties.

Washington Highlights

By Paul Wooton

Senator Hayden, of Arizona, and other friends of PWA are nurturing plans for continuing PWA's program of non-federal public works. Administrator Ickes is in a receptive mood but noncommittal, stating, March 31, that he is for any program that the President wants. Mr. Ickes said that he had not discussed with the President, Senator Hayden's bill for an appropriation of $700,000,000 for distribution as loans and grants.

Under a new contract, mutually satisfactory to Allegheny County, Pa., Commissioners and PWA, the original loan and grant of $24,500,000 has been reduced to a grant only, representing 30 per cent of the cost of labor and materials on projects estimated to cost $10,000,000 to $12,000,000.

The Bureau of Public Roads will continue to withhold federal highway funds from the state of Georgia as long as the existing situation continues. The total so held as a result of the failure of Governor Talmadge and the state highway department to conform with the bureau's requirements is $16,340,000. Thomas H. MacDonald, chief of the bureau, expressed full agreement with Senator George, that "it is not possible to release funds directly to the state highway department under the present situation."

Retention by the Reclamation Service of jurisdiction over its own projects in the Mississippi Valley will be provided for in the Norris bill to create a Mississippi Valley Authority. The amendment was proposed by John Page, Acting Commissioner of Reclamation. Senator Norris assured him that he had no objection to the amendment and that it is not intended by his bill to interfere with reclamation projects.

Obituary

WILLIAM R. REILLY, a surveyor of Regina, Sask., Canada, died there on March 24 at the age of 78. Mr. Reilley had gone to the western part of Canada in 1882 and since that time had been actively engaged in surveying, especially townsite work in Manitoba and Saskatchewan.

MAX ALBERT ZUERCHER, civil engineer for the Canadian Pacific Railway, died in Montreal, March 24, at the age of 86. Born at Seelbach, Germany, Mr. Zuercher was educated at the Carlsruhe Engineering School in Berlin. In 1880 he joined the C. P. R. at Winnipeg as a bridge engineer, and served the company for forty years in the bridge department, being transferred to the Montreal office in 1888.

WALTER VAN DER BEEN STRUBY, of Denver, president of the Missouri Southern Railroad, for six years, died suddenly in Chicago March 19. He was 45 years old, a graduate of Yale, and served in the aviation service during the World War.

CAPTAIN LOUIS H. PRELL, senior engineer at Fernbank Dam since 1930, died at his home at Sayler Park, Cincinnati, Ohio, on March 18. Captain Prell was 61 years old and had been attached to the Cincinnati District, Corps of Engineers, since Aug. 1, 1901. From 1917 to 1921 he had been in charge of the construction of the Ohio River dam 39, Florence, Ind., and later had charge of the completion of dam 38. Captain Prell was promoted to senior engineer in 1930 and in 1933 was assigned in charge of the Engineer Depot at Fernbank.

HUGH NISBIT, JR., civil engineer in charge of construction work for the Department of Streets and Sewers, St. Louis, Mo., died there March 26. He was 33 years of age.

CONSTRUCTION STATISTICS FOR THE WEEK

PUBLIC engineering construction awards stage a comeback this week with their return to a $34,000,000 volume for the week. The complete figures are: total, $43,563,000; private, $9,538,000; public, $34,025,000; federal, $1,978,000 and state and municipal, $32,047,000. Corresponding values for a year ago are: total, $25,156,000; private, $3,511,000; public, $21,645,000; federal, $4,463,000; state and municipal, $17,182,000.

The figures represent normal work going ahead and have not yet begun to reflect the major reconstruction that will be necessary due to widespread flood damage. The increase this week is due to a jump in highway awards to $15,580,000, public buildings also gained to a total for the week of $9,154,000. Other classes of work show the following totals: commercial buildings, $2,885,000; industrial buildings, $2,396,000; bridges, $1,397,000; sewerage, $1,488,000; waterworks, $2,065,000; earthwork, drainage, $2,550,000; and unclassified, $6,048,000.

The larger awards include: grain elevator for Bunge Elevator Co., Minneapolis, Minn., $400,000; lime kiln, Chemical Lime Co., day labor and separate contracts, Bellefonte, Pa., $500,000; N. Y. C. R.R. express service building, power plant, etc., Syracuse, N. Y., $581,000; Department of Public Works, arsenal and office building, Springfield, Ill., $1,192,000; school, East Rochester, N. Y., $500,000; power plant, Grand Forks, N. D., $650,000; junior high school, Scranton, Pa., $1,291,000; cottages and swimming pool, relief labor, city of Cleveland, Ohio, $475,000; street improvements, day labor, Omaha, Neb., $636,000; reconstructing and paving streets, relief labor, city of Milwaukee, Wis., $5,500,000; highways, by Michigan, $415,000; by Illinois, $1,297,000; by Texas, $836,000; 19,108 ft. steel and concrete pipe, 2 contracts, Tacoma, Wash., $358,000; Board Water Commissioners, West Side filter plant and equipment, 4 contracts, Denver, Colo., $482,000; Calumet Intercepting Sewer, contract 15, $442,000; U. S. Engineers, dredge, Louisville, Ky., $578,000; Bureau Reclamation, Schedule 1 and 4, Gila Valley Project, Schedule 2 and 3, two contracts, Arizona and California, $956,000; boardwalk, Long Beach, N. Y., $702,000; wharf and transit shed, Los Angeles, Calif., $403,000; 28,000 tons steel rails, Chicago, Milwaukee, St. Paul and Pacific R.R., in Illinois, $980,000; distribution and transmission lines, 1936 budget, own forces, So. Calif. Edison Co., Los Angeles, Calif., $2,350,000.

New capital is lower for the week with state and municipal bond sales for construction totalling only $4,099,000.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Apr. 1935	Prev. 4 Weeks	Week Apr. 2 1936
Federal Government	$4,661	$1,985	$1,978
State and Municipal	13,972	20,702	32,047
Total public	$18,633	$22,687	$34,025
Total private	10,610	14,862	9,538
Week's total	$29,243	$37,549	$43,563
Cumulative to date: 1935...$332,467,000		1936...$646,806,000	

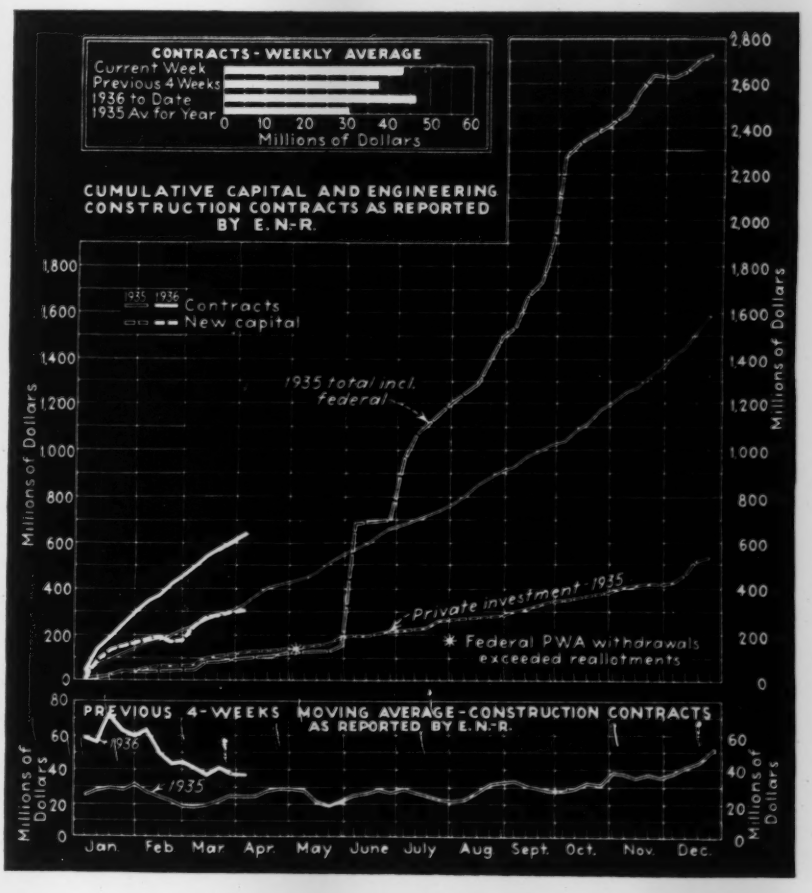
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1936	Week Apr. 2	Cumulative
State and municipal	$4,099	$145,052
PWA non-federal	....	49,644
RFC loans	....	25,000
Corporate issues	....	78,545
PWA loans	....	1,270
Total Non-Federal	$4,099	$299,511
Federal	....	4,771
Total new capital	$4,099	$304,282
Cumulative to date: 1935...$95,339,000		1936...$304,282,000

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Apr., 1936	202.20	97.20	Mar., 1936	160	70
Mar., 1936	201.20	96.71	Feb., 1936	176	77
Apr., 1935	194.50	93.49	Mar., 1935	101	44
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47


CONTRACTS - WEEKLY AVERAGE
Current Week
Previous 4 Weeks
1936 to Date
1935 Av for Year
0 10 20 30 40 50 60
Millions of Dollars
CUMULATIVE CAPITAL AND ENGINEERING CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1935 1936
Contracts
New capital
1935 total incl. federal
Private investment-1935
* Federal PWA withdrawals exceeded reallotments
Millions of Dollars
PREVIOUS 4-WEEKS MOVING AVERAGE-CONSTRUCTION CONTRACTS AS REPORTED BY E.N.-R.
1936
1935
Jan. Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

BUSINESS SIDE OF CONSTRUCTION

March Construction Gains 65 Per Cent Private Awards Show an Increase

ENGINEERING construction awards in March exceeded a year ago by 65 per cent but did not maintain the high rates of January and February. The drop was entirely in public awards both federal and state and municipal since private awards gained 41 per cent over February, 73 per cent over January and 169 per cent over March last year. Values for the month are: total, $150,197,000; private, $59,448,000; public, $90,749,000; federal, $7,316,000. Corresponding values for last year are: total, $90,958,000; private, $22,084,000; public, $68,874,000; federal, $13,493,000.

The drop in public awards is due chiefly to public buildings, although highway awards declined slightly. Adverse weather conditions prevailed over large areas throughout February and March. Private work gained, however, particularly industrial building awards which exceeded February by $6,000,000 and commercial buildings which increased $3,700,000 over February. The gain over March, 1935, was $17,400,000 for industrial buildings and $7,700,000 for commercial buildings.

Territorially, South and West of Mississippi showed gains for March over February, but other territories dropped below last month. New England maintained a [illegible] even rate.

New capital

State and municipal bond sales for the month totalled $53,518,000 compared with $37,697,000 in February and $49,738,000 in January. In each of the three months a block of PWA bonds was sold through RFC for private investment, a transfer from federal to private investment financing which is included in the figures above. Corporate security issues for March are the highest for any month since the security market began its recovery. The Jones and Laughlin issue which included $31,950,000 for plant extension and additions, is in large part responsible for this record.

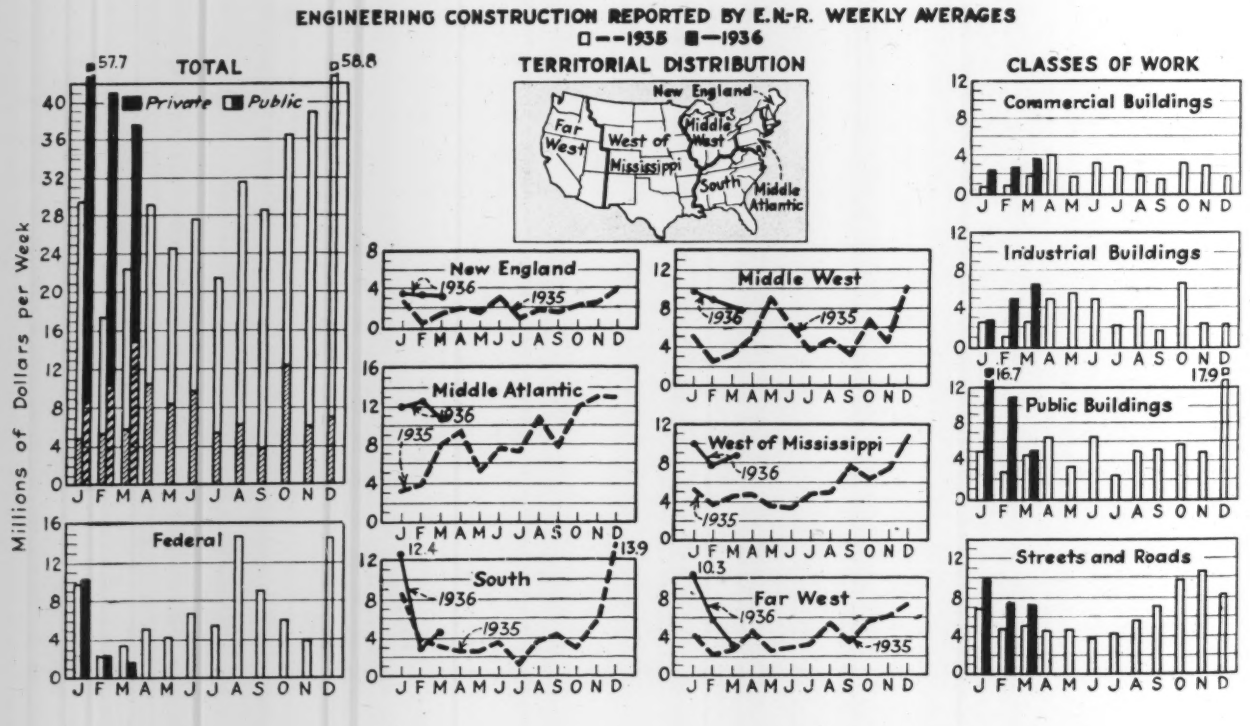
Materials

Cement—The Portland cement industry in February, 1936, produced 3,454,000 bbl.,

ENGINEERING CONSTRUCTION CONTRACTS REPORTED IN MARCH, 1936

Four Weeks—Thousands of Dollars (000 Omitted)

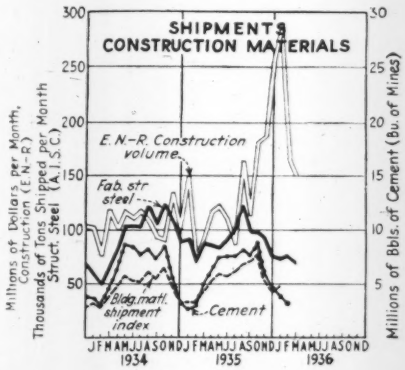
	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States March 1936	United States Three Months 1936	United States Three Months 1935	Canada March 1936
Public Works										
Waterworks	919	1,382	882	1,328	1,095	1,044	**6,650**	36,736	17,127	128
Sewerage	1,603	2,517	650	3,517	1,599	146	**10,032**	46,591	14,180	50
Bridges, public	2,656	3,781	647	2,405	1,809	516	**11,814**	42,862	20,661	...
Earthwork and waterways	322	183	991	89	2,189	831	**4,605**	52,972	51,029	125
Streets and roads	2,598	3,019	4,310	7,450	7,604	3,935	**28,916**	107,782	72,058	...
Buildings, public	1,451	5,892	2,680	2,837	6,601	1,314	**20,775**	144,488	55,074	200
Unclassified, public	1,255	3,510	199	1,169	279	11,545	**7,957**	27,000	11,134	125
Total public	10,804	20,284	10,359	18,795	21,176	9,331	**90,749**	458,431	241,263	628
Federal gov't (included in above classifications)	273	1,297	1,773	279	3,147	547	**7,316**	69,374	71,194	...
Private										
Bridges, private	...	49	...	40	...	...	**89**	1,509	4,581	...
Buildings, industrial	485	3,424	1,047	6,179	12,474	2,373	**25,982**	59,106	24,423	1,619
Buildings, commercial	470	11,881	50	2,065	...	265	**14,681**	37,253	14,283	140
Unclassified, private	595	6,639	6,377	3,957	710	418	**18,696**	46,944	22,761	3,000
Total private	1,500	21,993	7,474	12,241	13,184	3,056	**59,448**	144,812	66,048	4,759
March, 1936 (4 weeks)	**12,304**	**42,277**	**17,833**	**31,036**	**34,360**	**12,387**	**150,197**	.....	.....	**5,387**
February, 1936 (4 weeks)	13,241	50,226	11,385	35,066	31,224	23,357	**164,499**	.....	.....	3,216
March, 1935 (4 weeks)	5,734	32,101	12,736	12,582	17,479	10,326	**90,958**	.....	.....	5,714
Three months, 1936	42,293	152,319	91,372	114,436	115,666	87,157	.....	603,243	.....	20,706
Three months, 1935	20,344	65,950	70,958	47,955	60,376	41,728	.....	.....	307,311	14,794



shipped 3,156,000 bbl. from the mills, and had in stock at the end of the month 22,985,000 bbl. Production and shipments of Portland cement in February, 1936, showed increases of 13.1 and 6.9 per cent, respectively, as compared with February, 1935. Portland cement stocks at mills were 5.0 per cent higher than a year ago, as reported by the Bureau of Mines. The ratio of production to capacity was 14.9 in February, compared with 16.4 a year ago and 16.1 in January.

Steel—The operating rate of steel companies having 98 per cent of the steel capacity of the industry, reporting to American Iron and Steel Institute rose to 60 per cent for the third week of March but dropped back to 53.7 per cent the following week. These rates, however, compare with rates of 46 and 47 per cent a year ago.

Production of fabricated structural steel in February declined to 33.9 per cent of normal, while bookings held up very well, according to reports received by the American Institute of Steel Construction. During


SHIPMENTS CONSTRUCTION MATERIALS
E.N-R. Construction volume
Fab. str. steel
Bldg. matl. shipment index
Cement
Millions of Dollars per Month, Construction (E.N-R.)
Thousands of Tons Shipped per Month Struct. Steel (A.I.S.C.)
Millions of Bbls. of Cement (Bu. of Mines)
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1934
1935
1936

the first two months of 1936, the bookings averaged 49.4 per cent of normal, (normal being considered as the annual average of shipped tonnages as published by U. S. Department of Commerce for the years 1928-1931, inclusive). This was better than for any similar period of 1935. The bookings of fabricated structural steel during the twelve months of 1935 averaged 38.1 per cent of normal. Estimated shipments for February total 69,855 tons compared with a revised total tonnage estimate for January of 78,438.

Lumber—Lumber production increased from 51 per cent of 1929 weekly average production during the first week of March to 60 per cent for the third week. Shipments increased from 58 per cent of average 1929 shipments to 65 per cent for the third week of March. Both production and shipments exceed 208,000,000 feet per week.

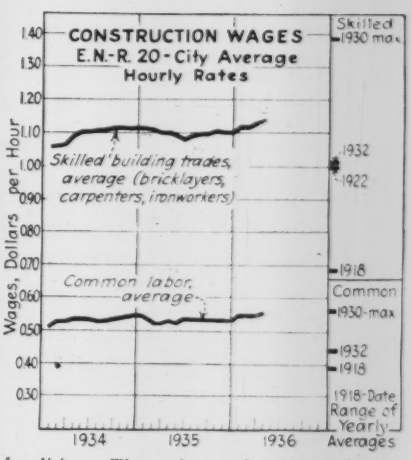
Building permits

The value of building permits issued in February continued to show a large percentage gain over the like month of 1935, but fell slightly below the level of the preceding month according to returns from 215 cities of the United States recorded by Dun & Bradstreet, Inc. Estimated expenditure for new buildings, additions, alterations and repairs during February amounted to $51,406,138, compared with $54,957,904 in January, a decline of 6.5 per cent. When compared with the $27,636,367 figure recorded in February a year ago, however, last months' permit total showed a gain of 86.0 per cent. The bulk of the decline shown in February from January occurred in the Middle Atlantic and East Central groups of states, with the New England section showing only a small decrease. The other five groups all contributed increases, ranging from 0.6 per cent in the Mountain group to 58.6 per cent in the South Central division.

The total value of permits issued in 1,415 identical cities covered by the Bureau of Labor Statistics during February, shows an increase of 86.8 per cent over the corresponding month of 1935. This gain was shared by all types of construction, but the greatest improvement was in residential construction, which shows an increase of 189.5 per cent over February, 1935. For new non-residential construction the increase over the corresponding month of last year was 70.6 per cent and the value of permits issued for additions, alterations, and repairs to existing structures shows a gain of 26.7 per cent. These figures are based on reports from 1,415 identical cities having a population of 2,500 or over. The per cent of change from January to February for each of the different types of construction is: New residential building, an increase of 18.7 per cent in number and 15.0 per cent in estimated cost; new non-residential building, a decrease of 24.4 per cent in number and 11.7 per cent in estimated cost; and additions, alterations, and repairs, a decrease of 7.5 per cent in number and 11.8 per cent in estimated cost.

Labor

Reports received by the U. S. Bureau of Labor from 8,776 contractors employing 53,695 workers in February showed a decrease of 15.7 per cent in number of employees over the month interval, while pay rolls decreased 19.9 per cent. These decreases are somewhat larger than the declines shown in February of the immediately preceding years for which information is available and are attributable to reduced operations caused by the sub-zero weather prevalent in many



localities. These data refer to employees engaged in erecting, altering, and repairing private buildings and do not include projects financed by the Public Works Administration, Reconstruction Finance Corporation funds or regular appropriations of the Federal, State, and local governments.

A gain of more than 250,000 workers on the program financed from the Emergency Relief Act of 1935 featured the Federal employment reports for the month of February. There were nearly 3,260,000 employed on this program during the month ending February 15. Of this number, 2,900,000 were working on projects operated by the Works Progress Administration, and in excess of 350,000 were employed on the Federal program. Pay rolls for the month amounted to nearly $150,000,000. The Public Works program gave employment to nearly 190,000 people during February. This is a decrease of slightly more than 10,000 as compared with the preceding month. Pay-roll disbursements for the month exceeded $12,000,000

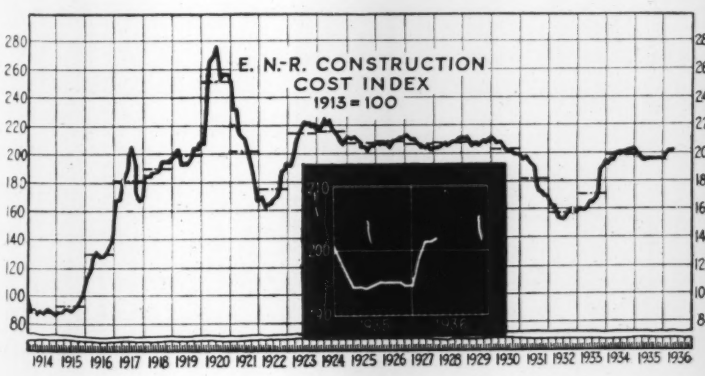
ENR Cost and Volume Index

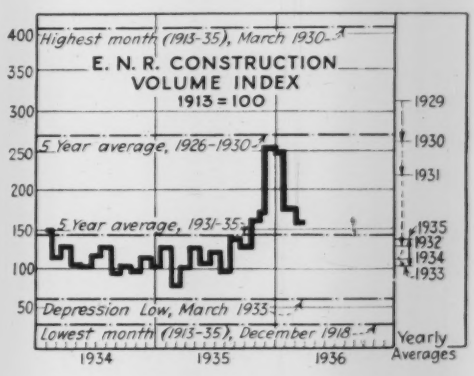
THE *Engineering News-Record* Construction Cost Index is 202.20 for April. The increase is due to an increase in the labor wage average.

The *ENR* Volume Index is 160 for March.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Apr., 1936	**202.20**	**97.20**	**Mar., 1936**	**160**	**70**
Mar., 1936	201.20	96.71	Feb., 1936	176	77
Apr., 1935	194.50	93.49	Mar., 1935	101	44
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47





CURRENT PRICES OF CONSTRUCTION MATERIALS

CEMENT, AGGREGATES AND READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT (Per bbl., carload lots, including 40c. per bbl. for bags, cash discount not included)			SAND AND GRAVEL (Per ton, carload lots)			CRUSHED STONE (Per ton, carload lots)		CRUSHED SLAG (Per ton, carload lots, f.o.b. plant)		CONCRETE (Ready Mixed 1:2:4, 50c.y. or more, delivered)
	Cloth Bags*	Paper Bags	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	
Atlanta	$3.02	$2.79	$2.50	$2.31	$2.31	$1.64	$1.69	$1.92	$1.80	$1.80	$8.50
Baltimore	2.65	2.40	2.15	1.80‡	1.80‡	1.30‡	1.80‡	.80‡	1.80	1.80	7.25
Birmingham	2.40	2.15	1.95	1.80	1.80	1.45	1.00	1.00	.90	1.15	5.45
Boston	2.42	2.17	1.92	1.40	1.40	.90	1.40	1.40	.....	.....	6.50
Chicago	2.60	2.35	2.20	1.50	1.50	1.44	1.80	1.80	.90	1.10	.....
Cincinnati	2.50	2.25	2.05	1.20	1.20	1.30	1.80	1.80	.....	.....	6.70
Cleveland	2.41	2.16	.....	1.40	1.40	1.30	1.60	1.60	1.55	1.75	7.15e
Dallas	2.45	2.20	2.00	1.55	1.55	1.30	1.95	2.05	.....	.....	7.00
Denver	3.09	2.84	.....	1.20	1.40	.90	.....	.....	.....	.....	.....
Detroit	2.26	2.01	1.81	1.35	1.35	1.20	1.40	1.60	1.35‡	1.45‡	6.75
Kansas City	2.51	2.26	2.06	.....	1.85	1.25	1.85	1.80	.....	.....	7.65
Los Angeles	2.32	2.12	.....	1.20	1.20	.90	1.20	1.20	.....	.....	6.31
Minneapolis	2.90	.....	2.45	1.00p	1.00p	.25p	1.00p	1.00 p	.....	.....	6.75d
Montreal	.....	1.70	.....	.85	.90	1.25	.85	1.20 p	.....	.....	4.50f
New Orleans	2.47	2.22	2.00	1.50	1.50	1.25	.....	.....	.....	.....	8.25
New York	2.60‡	2.35‡	.....	1.20†c	1.20†c	.70†k	1.75†t	1.85†k	.....	.....	8.00
Philadelphia	2.63	2.38	2.18	1.35‡	1.45‡	1.05‡	2.60‡	2.75‡	1.00‡	1.00‡	7.75
Pittsburgh	2.46	2.21	1.61	1.50‡	1.50‡	1.70‡	2.25‡	2.25‡	1.50	1.50	7.00
St. Louis	2.53	2.28	.....	1.40‡	1.40‡	1.40‡	.75p	.75p	.65/.95§	.50/.95§	6.80
San Francisco	2.72	2.52	2.20	1.35	1.35	1.35	1.50	1.50	.....	.....	7.53
Seattle	2.95	2.70	.....	1.00	1.00	1.00	1.44	1.44	.....	.....	6.75

*10c. allowed for each returnable bag. †Per cu. yd. ‡Delivered. §F.o.b. Granite City, Ill. ▲Barge lots alongside dock. ▼f.o.b. plant. ₤5 tons or more. ₹Within 3-mi. from Pub Square. ₹ton. d 25c. discount for cash.

CURRENT MAXIMUM PRICES RECEIVED AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Alpena, Mich.	$1.50	$1.45	Ironton, Ohio	$1.50	$1.45	North Birmingham, Ala.	$1.75	$1.70
Buffington, Ind.	1.70	1.65	Iola, Kans.	1.70	1.65	Richard City, Tenn.	1.85	1.80
Crestmore, Calif.	1.72	.....	La Salle, Ill.	1.70	1.65	Saginaw, Mich.	1.50	1.45
Dallas, Tex. (Inc. 5c. tax)	1.80	1.75	Limedale, Ind.	1.70	1.65	Steelton, Minn.	1.80	1.75
Hannibal, Mo.	1.70	1.65	Mason City, Ia.	1.70	1.65	Universal, Pa.	1.65	1.60
Hudson, N. Y.	1.75	1.70	Norfolk, Va.	1.76	1.71	Waco, Tex. (Inc. 5c. Tax)	1.80	1.75
Independence, Kans.	1.70	1.65	Northampton, Pa.	1.65	1.60	Wyandotte, Mich.	1.45	1.40

Cash Discounts, Cement, to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount, 10c. per bbl. for payment within 15 days of date of invoice.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED (Per M. lots of 2,000 pieces or over)			STRUCTURAL CLAY TILE—LOAD BEARING—SCORED (Per M. lots of 2,000 pieces or over)			BRICK (Per M. in quantity)		LIME		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Per ton, Hydrated finishing	in paper, Common hydrated	carload lot, Pulverized or lump
Atlanta	$75.80	$80.80	$151.60	$181.90	$212.20	$242.50	$14.25	$14.25	$24.00	$17.00	$15.90
Baltimore	91.00	98.00	183.00	219.00	315.00	390.00	13.00	17.00	16.00	12.50	18.50
Birmingham	78.75	84.00	157.50	189.00	201.25	242.00	15.00	19.00	2.50§	1.50§	2.00§*
Boston	84.40₤	90.00₤	168.75₤	191.25₤	246.75₤	282.00₤	14.50	18.00	19.50	15.00	3.40d
Chicago	66.00	70.40	132.00	174.30	214.40	245.00	10.20	11.20	18.00	13.40	14.00
Cincinnati	55.00	58.70	110.00	124.10	164.20	187.70	17.50	17.50	15.97	12.48	.....
Cleveland	45.00	48.00	90.00	108.00	138.50	158.50	15.00	15.00	16.00k	14.00k	2.65kp
Dallas	72.00	75.00	149.00	177.00	217.00	269.00	13.50	26.00	19.00	16.00	1.65p
Denver	78.50	88.00	141.50	166.50	196.00	225.00	11.50	15.00	30.00	22.00	22.50
Detroit	71.85	76.65	143.70	230.00	280.00	325.00	12.50	13.50	14.25	11.90	22.20
Kansas City	72.50	75.50	92.00*	140.50	177.75	207.25	15.00	24.00	18.00	11.89	14.20*
Los Angeles	77.50	94.25	134.00*	188.00	232.50	311.50	11.50	14.00	18.70	.....	19.70
Minneapolis	80.15s	85.50s	145.40s	167.75s	175.25s	243.70s	13.10	15.10x	25.50	21.00	23.00
Montreal	79.10s	90.40	169.50s	.....	212.40	136.60	20.75	31.00	15.00	10.00	7.00
New Orleans	69.10	69.10	129.50	155.40	203.40	251.80	14.00	.....	18.90	11.35	.....
New York	78.40	83.60	125.40*	193.30†	238.80†	295.60†	11.50	.....	20.00	15.50	20.00
Philadelphia	76.00	80.00	150.00	172.00	240.00	295.00	18.00	20.00	16.35	11.25	10.75
Pittsburgh	58.40c	62.30c	116.85c	165.00c	217.00c	250.00c	16.50	25.00	17.20	14.50	2.22p
St. Louis	62.00	65.00	120.00	180.00	234.00	280.00	15.00	18.00	22.00	16.00	2.25p
San Francisco	84.00	94.50	225.00	.....	.....	.....	15.00	18.00	22.11	21.50	2.05p
Seattle	84.00	95.50	180.00	198.00	.....	.....	15.50d	18.50	30.00	20.00	28.60p

*6x12x12 in. †F.o.b. Perth Amboy, N. J. ‡Per sack. §Per bbl., 200 lbs. ₹Per bbl. 180 lbs. ₹per bbl. 280-lb. kLCL. dless $1 cash 15 days. ▲lump. ₹Smooth. xSelected common. ₹Carload lots delivered to job.

ROAD SURFACING MATERIALS—F.O.B. CITY

	PAVING BRICK AND BLOCKS			PAVING ASPHALT (Per ton, less than 80 penetration)		ASPHALT BINDERS—FLUXES (Per gal., 80-300 penetration)		CUTBACK ASPHALT (Per ton)		ROAD OILS (Per gal.)	ASPHALT EMULSION (Per gal.)	
	Granite per M. lots of 50,000, 4x4x8 in.,	Brick per M., 3x4x8½ in., carload lots	Wood per sq. yd., 3½ in., 16-lb. treat,	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drum
Atlanta	$ 75.00	$35.00	$2.25	$18.20z	$23.41z	$0.728z	$0.999†	$19.20z	$27.22z	$0.668z	$0.0875	$0.0875
Baltimore	110.00	44.00	2.25	17.00	22.00	.075	.10	.09†	.125†	.....	.....	.....
Birmingham	110.00	25.00	.....	19.00	24.00	.0878	.1128	.10†	.137†	.....	.06	.....
Boston	78.00	28.00	2.75	17.00	22.00	.07	.095	.09†	.12†	.07	.095	.125
Chicago	125.00	42.00	2.60	16.00	20.00	15.00	19.00	.07	.11	.05	.....	.....
Cincinnati	115.00	37.00	.....	18.00	22.00	.09	.....	18.50	.....	.07	.08	.....
Cleveland	100.00‡	32.75	2.85	17.00	21.00	.07	.08	.075†	.045†	.0525	.085	.095
Dallas	.....	30.00	.....	16.50	21.00	.065	.16	17.50	25.00	.055	.10	.105
Detroit	.....	37.00	.....	16.80c	21.00c	.....	.....	17.00	22.50	.055	.11	.15
Kansas City	.....	45.00	.....	18.50	23.50	17.50#	22.50#	.077†	.107†	.057	.11	.15
Los Angeles	.....	50.00	.....	10.80	14.95	10.80#	14.95#	10.80	.....	.042	.06	.12
Minneapolis	.....	.....	1.75	18.20	24.70	.098	.098	21.85	34.65	.048	.....	.....
Montreal	70.00	60.00	3.62	14.00	19.66	.07	.093	19.00	26.50	.07	.135	.165
New Orleans	100.00	32.00	.....	15.00	18.75	.068	.095	.075†	.10†	.....	.0785	.11
New York	130.00§	65.00	2.64	17.00	22.00	.075	.10	.09†	.125†	.....	.075	.11
Philadelphia	110.00	45.00	2.25	13.50	18.00	.05	.08	.05†	.08†	.045	.08	.....
Pittsburgh	115.00	40.00	.....	19.00	24.00	.0775	.1125	.086†	.121†	.0675	.....	.....
St. Louis	40/115.00	35.00	.....	19.70	24.70	.0775	.1075	.0825†	.1125†	.045	.09	.125
San Francisco	.....	50.00	.....	12.00	18.00	12.00#	18.00#	12.50#	23.00#	.04	.0575	.117
Seattle	.....	35.00	.....	25.50	25.50	17.00#	23.00#	15.00	.....	.03	.19	.20

Note: Paving asphalt, tank car or boat, f.o.b. Maurer, N. J., per ton, Bermudez, $25.00; Trinidad, $21.00. *Per sq. yd. †Per gallon. ‡4½x6x5½ in. §4x5x9-in. Av. ▲Mexican. zLocal reduction due to 20% reduction intra-state class freight rates, only Georgia affected. c 2½ in. 6 to 8-lb. treatment. #Per ton

NOTE: Pittsburgh prices are carried over from March. Because of paralysis of communications and office facilities due to flood, it has been impossible to make usual check of prices in time for this issue.

CURRENT PRICES OF CONSTRUCTION MATERIALS

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¾-in. billet,	RIVETS ½-in. structural	WIRE NAILS Base	SHEET PILING Base	STEEL RAILS Per Gross Ton			TRACK SUPPLIES			
						Standard	Light	Re-rolled	Angle bars	Std. spikes	Tie plates	Track bolts
Birmingham	$1.95	$2.10	$3.00	$2.55	...	$36.375	$36.37	$35.00	$2.55	$2.63	$1.90	$3.60
Chicago	1.85	2.10	3.00	...	$2.25	36.375	33.00	34.00	2.55	2.60	1.90	3.60
Pittsburgh	1.80	2.05	2.90	2.10	2.15	36.375	35.00	34.00	2.55	2.60	1.90	3.60

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

F.O.B. WAREHOUSE	STRUCTURAL SHAPES Per 100 lb., base price	REINFORCING BARS Per 100 lb., ¾ in., base price		EXPANDED METAL LATH —Per 100 sq.yd., carload lots—		WELDED FABRIC REINFORCING —Per 100 s.f., carload lots—		6x6 in., No.	SHEET PILING
		New billet	Rail steel	Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6 & 6 wires Per sq yd.	Per 100-lb. base price
Atlanta	$3.36	$2.34	$2.19	$21.00	$23.00	$1.53	$1.16	$0.1449	$2.70
Baltimore	3.00	2.75	2.60	25.00	28.00	1.41	1.08	.1332	2.45
Boston	3.54	2.923	1.925	20.00†	22.00†	1.46	1.12	.1449	2.60
Chicago	3.20	2.10	1.95	22.00	24.00	1.40	1.08	.1323	2.25
Cincinnati	3.40	3.25	3.25	25.01	29.50	1.39	1.07	.1287	...
Cleveland	3.31	2.75	2.60	20.00	22.00	1.37	1.06	.1287	...
Dallas	3.82	3.05	2.90	21.00	28.00	1.63	1.23	.1548	3.005
Denver	3.95	3.76	3.61	22.00	25.00	1.68	1.26	.1584	...
Detroit	3.42	2.21	2.05	20.00†	22.00†	1.41	1.08	.1323	2.45
Kansas City	3.75	2.75	2.60	22.50	23.50	1.50	1.14	.1422	2.69
Los Angeles	2.35	2.275	...	23.00	27.50	1.68	1.26	.1584	2.65
Minneapolis	3.45	2.86	2.71	22.00	26.00	1.51	1.15	.1431	2.57§
Montreal	2.90	2.40	2.30	32.00	33.00	2.30	1.71	.238	2.80
New Orleans	...	...	...	21.00	24.00	1.54	1.17	.1458	...
New York	3.37	2.50	2.35	19.50	21.50	1.44	1.11	.1359	2.50
Philadelphia	2.98	3.06	2.22	20.00	24.00	1.42	1.09	.1332	2.46
Pittsburgh	1.80‡	1.85‡	1.70‡	20.00‡	22.00‡	1.34	1.04	.1260	2.15
St. Louis	3.45	3.00	2.85	22.00	24.00	1.42	1.09	.1341	2.30
San Francisco	3.15	2.475	2.325	23.00	28.00	1.68	1.26	.1584	2.60
Seattle	3.55	2.50	...	24.50	26.50	1.68	1.26	.1584	2.60

‡Base Mill Price. Note: Shapes, bars and piling subject to quantity discounts. §Mill Price plus freight to Minneapolis. †f.o.b. delivered.

PAINTING AND ROOFING SUPPLIES—F.O.B.

	RED LEAD Per 100 lb. in 500-lb. lots	WHITE LEAD Per 100 lb. in 500-lb. lots#	READY-MIXED PAINT Per gal., drums			ROOFING SUPPLIES Carload lots, f.o.b. factory				
	Dry	in oil	Graphite*	Aluminum†	Ferric Oxide‡	Rolls, slate surfaced, 85-90 lb., per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating, per gal.	Tar pitch, 350-lb. bbl., per ton
Atlanta	$7.75	$10.50	$1.60	$3.10	...	$1.775	$1.85	$1.85	$.36	$25.40
Baltimore	7.00	10.00	1.40	2.25	$1.90	2.35	2.55	2.55	.48	25.00
Birmingham	7.25	10.50	2.35	2.35	1.85	1.68	1.63	1.69	.36	21.88
Boston	7.00	10.00	1.80	2.65	.05x	1.80	3.25	3.25	.45	22.00
Chicago	7.00	10.00	1.35	2.45	1.30	1.55	2.50	2.50	.38	22.00
Cincinnati	7.00	10.00	1.45	2.50	1.40	2.40	2.39x	2.39x	.36	21.00
Cleveland	7.00	10.00	1.65	2.30	1.40	1.55	1.75x	1.75x	.23	19.00
Dallas	7.25	11.00	1.80	2.10	...	2.35x	3.80	3.80	.14	35.00
Denver	7.50	10.75	2.55	...	...	2.25	3.55	3.55	.35	30.00
Detroit	7.00	10.00	1.65	2.30	1.40	2.55	2.80	2.55	.35	30.00
Kansas City	7.00	10.12½	1.25	2.65	1.00	2.05	3.10–3.20	3.10–3.20	.23	24.50
Los Angeles	7.25	10.25	1.60	2.25	2.30	2.00	1.50	...	.45	...
Minneapolis	7.00	10.12½	...	...	...	1.78v	1.52½v	1.52½v	.29	23.30
Montreal	...	8.20	1.85	3.50	1.85	1.90	2.44	1.88	1.55§	1.52§
New York	7.00	10.00	1.75	2.35	1.40	1.65	1.46x	1.46x	.23	22.00
Philadelphia	7.00	10.00	2.50	2.95	1.50	1.68	1.86x	1.48x	.37	22.00
Pittsburgh	7.00	10.00	1.05	1.95	.80	1.75	1.65x	1.65	.38	25.00
St. Louis	10.00	10.00	1.85	2.45	1.30	1.78x	2.525	2.525	.25	25.00
San Francisco	7.25	10.25	1.80	2.75	1.10–2.00	1.89	3.10	3.10	.38	26.00
Seattle	7.25	10.25	1.80	2.85	2.20	3.30	2.66	2.60	.60	30.00

*U. S. War Dept. Spec. 3-49A. †ASTM Spec. D266-31. ‡80% maximum ferric oxide. §Per 100 lb. xPer lb. vMinneapolis & vicinity
Note: Red lead in oil 50c higher than white lead in oil. #Basis of quoting changed this month from list to 500-lb. lots.

MISCELLANEOUS ITEMS

	WINDOW GLASS Discounts from latest jobbers List, Sept. 15, 1928 Single or Double Thickness		EXPLOSIVES Per lb. dynamite delivered 50-lb. cases Gelatin	
	A quality	B quality	40%	60%
Atlanta	85%	85%	$0.155	$0.17
Baltimore	88%	90%	.16	.175
Birmingham	88%	90%	.105	.120
Boston	86–10–5%	90–10–5%	.15	.18
Chicago	87%	89%	.155	.17
Cincinnati	89–10%	91–10%	.27	.29
Cleveland	89%	89%	.20	.215
Dallas	87%	89%	.1675	.1825
Denver	86%	88%	.155	.17
Detroit	87–10%	89–10%	.225	.240
Kansas City	86–10%	87–10%	.15	.175
Los Angeles	90%*	90–40%	.1725†	.1925†
Minneapolis	86%	88%	.175	.19
Montreal	60–30%	70–5%	.1875	.2125
New Orleans	88%	90%	.19	.22
New York	88%	90%	.225	.24
Philadelphia	88%	90%	.1550	.17
Pittsburgh	88%	88%	.11	.1250
St. Louis	89%	89%	.11	.125
San Francisco	80%	85%	.1575	.1775
Seattle	90–10%	90–20%	.1425	.1575

*Disc. from list Aug. 1, 1929. †F.o.b. Arsenal. ‡Double thickness A & B.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York.	
Bleaching powder, in drums, F.o.b. works, per 100 lb.	$2.00–$2.10
Calcium chloride, 77-80%, flaked, in 400-lb. drums or 100-lb. moisture proof bags, f.o.b. works, freight equalized with points of competition, per ton	22.00–35.00
Chlorine cylinders, per lb. delivered	.055–06
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.35
Soda ash, 58%, in paper bags, per 100 lb. dense	1.25
Sulphate of aluminum, commercial, in 100 lb. bags per ton	27.00
Sulphate of copper, in bbl., per 100 lb.	3.85–4.00

PILES

Prices per linear foot, pine, with bark on, f.o.b. New York; delivered from barge 1½ to 2c. per ft. additional:

Dimensions	Points	Length	Short Leaf Barge	Short Leaf Rail	Long Leaf Barge	Long Leaf Rail
12 in. at butt	6 in.	30 to 50 ft.	$0.12	$0.165	$0.13	$0.16
12 in.—2 ft. from butt.	6 in.	50 to 59 ft.	.16	.21	.15	.20
12 in.—2 ft. from butt.	6 in.	60 to 69 ft.	.17	.225	.16	.21½
14 in.—2 ft. from butt.	6 in.	50 to 69 ft.	.195	.235	.20½	.24½
14 in.—2 ft. from butt.	6 in.	70 to 79 ft.	.2125	.245	.24½	.30½
14 in.—2 ft. from butt.	5 in.	80 to 85 ft.	.275	.385	...	...
14 in.—2 ft. from butt.	5 in.	85 to 89 ft.	.315	.452	...	...

RAILWAY TIES

Prices f.o.b., per tie, for carload lots:		6 In. x 8 In. by 8 Ft.	7 In. x 9 In. by 8½ Ft.
Boston	Oak, untreated	$1.25	$1.80
	Pine, untreated	1.35	1.85
	Pine, creosoted	1.75	2.45
New York	Long-leaf sap pine, untreated	.80	1.00
	Mixed oak, untreated	...	1.00
	White oak, untreated	.75	1.25
Birmingham	Red oak, creosoted	1.40	1.60
	Southern pine, untreated *6x8x8'6'	.45*	.60
	Southern pine, creosoted	1.00*	1.25
	White oak, untreated	1.15	1.40
Chicago	Oak, empty cell, creosoted	1.50	1.88
	Oak, zinc treated	1.40	1.70
	Southern pine, creosoted	1.35	1.78
Los Angeles	Fir, untreated	.50	.72
	Fir, creosoted	1.67	2.40
Philadelphia	Red oak, untreated	1.00	...
	Red oak, creosoted	...	2.10
	White oak, untreated	1.13	1.45
St. Louis	Red oak, untreated	1.10	1.40
	Red oak, creosoted	1.50	1.95
	Sap Pine or cypress, untreated	.95	1.30
San Francisco	Douglas fir, green, untreated	.45	.63
	Douglas fir, empty cell, creosoted	1.14	1.56
Montreal	Birch or maple, untreated	1.00	1.10
	Birch or maple, creosoted	1.25	1.55

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CURRENT PRICES OF CONSTRUCTION MATERIALS

WATER, SEWER AND DRAIN PIPE

	C. I. PIPE	VITRIFIED SEWER PIPE				CLAY DRAIN TILE		CONCRETE SEWER PIPE		WROUGHT STEEL PIPE			
	Per net ton, f.o.b. 6 in. to 24 in.*	Per foot, delivered, standard (‡ f.o.b.) 8 in., s.s.	12 in., s.s.	24 in., d.s.	36 in., d.s.	Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	Per ft., delivered; ASTM C 14-24 12 in.	24 in.	Full standard weight. # 1 to 3 in., Butt Weld Black ¢	Galv. ¢	3½ to 6 in., Lap W Black ¢	Galv ¢
Atlanta	$43.00	$0.225d	$0.405d	$1.4625	$4.50	$80.00	$128.00	$0.50	$1.625	49.5	49.5	47	37.5
Baltimore	46.50	.25	.50	2.10	5.75	108.00	168.50	.75	2.00	.....	.....	.....	.....
Birmingham	39.00	.25	.45	1.625	4.66	85.00	220.00	.45	1.60	64	55	65	56
Boston	46.50	.21	.405	1.89	5.6375	99.00	153.00	.40	2.25	.....	.....	.....	.....
Chicago	47.50	.21	.35	1.60	4.60	60.00	120.00	.36	1.42	53	42	54	43
Cincinnati	46.00	.189	.3645	1.62	5.53›	69.00	108.00	.40	1.40	53.04	42.02	54.265	43.24
Cleveland	47.50	.168	.324	1.44	4.6125	42.50	88.50	.35	1.74	58.4	48.4	60.6	49.6
Dallas	51.00	.35	.67	2.70	.....	165.00	260.00	.46	1.57	64	55	64	56
Denver	59.00	.27‡	.47‡	1.98‡	.....	105.00	180.00	.....	.....	56	45	43*	57*
Detroit	47.50	.189	.3645	1.62	5.74	82.00	136.00	.35	1.20	49	38	50	39
Kansas City	49.00	.30	.54	2.16	4.90	120.00	140.00	.40	1.50	55	45	51.5	41
Los Angeles	47.50	.2825‡	.508‡	2.03‡	5.535‡	115.50	192.50	1.00	2.00	53.57	43	53	42.51
Minneapolis	49.50	.255	.459	1.836	4.67	.....	.....	.50	1.34	.....	.....	.....	.....
Montreal	50.00	.33¢‡	.59¢‡	2.04¢‡	.....	82.00	134.00	.51	2.04a	.....	.....	.....	.....
New Orleans	45.00	.25	.45	1.625	.....	67.00	.....	.45	1.65	.....	.....	.....	.....
New York	46.00	.25	.55	2.00	6.25	.....	.....	.55	2.00	57.50*	47.50*	54.375*	43.7*
Philadelphia	43.00	.336	.648	2.835	8.68	175.00	210.00	.54	1.80	52.37*	41.35*	53.39*	42.57
Pittsburgh	49.00	.182‡	.351‡	1.62‡	4.92‡	69.00	108.00	.75c	1.75	64	55	65	56
St. Louis	46.00	.255	.459	1.836	3.96	85.00	170.00	.80	2.00	51.266	41.245	52.49	41.47
San Francisco	47.00	.29	.522	2.088	5.67	103.50	172.50	.45	2.20	52.4	63.4	51.1	64.6
Seattle	48.50	.4225	.63†	3.06†	7.55†	85.00	200.00†	.50†	1.80	65.80	57.25	66.75	56.30

*b. & s. class B and heavier, C/L lots, 200 tons and over. Burlington, N. J. (base) $43.00. Gas pipe and class A, $3 per ton additional. 4-in., $3 per ton additional. 30 in. and larger usually $2 per ton less.

#Discounts from standard list for delivery from warehouse, except Pittsburgh prices f.o.b. mill. Base price $200 per net ton. List prices per ft.: ⅛ in., 8½c; ¼ in. 11½c.; ½ in. 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92.

›2½ to 3 in. *Resale price to consumer, car load lots shipped from mill.

†Less 30% in C/L Lots. c Concrete Culvert pipe reinforced. dDouble strength. ‡Sales & municipal taxes extra a Delivered.

LUMBER AND TIMBER—PER M FT. B.M., CARLOAD LOTS F.O.B.

		SHORT LEAF YELLOW PINE AND DOUGLAS FIR — All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. All Fir planks No. 2 common; Fir timber is No. 1 common. Lengths up to 20 ft.								LONG LEAF Y. P. Merchantable grade up to 20 ft.	
		1x6,S	1x8,S	2x4,S	2x6,S	2x8,S	2x10,S	3x12,R	6x12,R	12x12,R	2x12,R	12x12,R
Atlanta	Southern Pine	$17.50	$17.50	$19.50	$19.50	$19.50	$21.50	$25.00	.....	.....	$38.50	$40.00
Baltimore	Southern Pine	23.50	24.00	27.50	26.50	27.00	29.00	37.50	.....	.....	55.00	58.00
	Douglas Fir	29.50	29.50	28.50	28.50	28.50	29.50	30.50	$32.50	$31.00	.....	.....
Birmingham	Southern Pine	21.00	21.00	19.00	18.00	20.00	20.00	29.00	28.00	28.00	.....	.....
	Long Leaf	22.00	22.00	22.50	21.50	22.50	25.50	43.00	.....	.....	45.00	42.00
Boston	Southern Pine	28.00	28.00	33.00†	33.00†	47.00†	55.00†	70.00†	.....	.....	70.00	53.00
	Douglas Fir	28.00	28.00	33.00	33.00	35.00	35.00	40.00	40.00	40.00	.....	.....
Chicago	Southern Pine	29.50	29.50	33.50	32.50	32.50	35.50	45.50	.....	.....	54.50	54.50
	Douglas Fir	34.50	35.50	39.50	37.50	38.50	39.50	41.50	41.50	41.50	.....	.....
Cincinnati	Southern Pine	23.00	25.00	26.00	25.00	25.50	26.50	40.00	.....	.....	31.50	.....
	Douglas Fir	.....	.....	.....	.....	.....	.....	43.50	46.25	46.25	.....	.....
Cleveland	Southern Pine	30.00	32.00	38.00	32.00	36.00	38.00	49.00	.....	.....	52.00	64.00
Dallas	Southern Pine	d28.35	30.60	31.50	29.80	30.15	30.15	50.41	.....	.....	42.75	67.95
Denver	Douglas Fir	42.00	42.00*=	43.00*	43.00*	43.00*	47.00*	52.00*	56.00*	61.50	.....	.....
Detroit	Southern Pine	24.00	24.00	25.00	24.50	24.50	25.50	35.00	.....	.....	29.00	41.50
	Douglas Fir	.....	.....	.....	.....	.....	.....	41.50	41.50	41.50	.....	.....
Kansas City	Southern Pine	25.50	26.50	25.50	24.50	25.50	26.50	37.00	.....	.....	55.00	62.50
	Douglas Fir	28.50	29.50	30.00	27.50	28.00	30.00	35.00	37.00	37.00	.....	.....
Los Angeles	Douglas Fir	31.00y	31.00y	31.00y	31.00y	31.00y	31.00y	38.00y	48.00y	41.00y	.....	.....
Minneapolis c	Western Pine	45.00*	51.50*	50.00*	41.00*	41.00*	42.00*	59.50*=	.....	.....	58.00**	.....
	Douglas Fir	39.00*	42.00*	43.50*	41.00*	41.00*	42.00*	59.50*	59.50*	59.50*	.....	.....
Montreal	Spruce	31.00	32.00	28.00	27.00	30.50	39.25	41.00	.....	.....	.....	.....
	Douglas Fir	47.50	53.00	42.50	44.00	44.00	45.75	51.00	51.00	51.00	43.00	.....
New Orleans	Southern Pine	23.50	25.50	28.00	25.00	27.00	25.50	38.00	.....	.....	44.00	54.00
	Douglas Fir	28.50	30.00	33.00	29.00	32.00	33.50	37.00	.....	.....	.....	.....
New York	Southern Pine	33.00*	34.00*	33.00*	34.00*	34.00*	38.00*	45.00*	.....	.....	70.00*	70.00*
	Douglas Fir	.....	.....	37.00*	37.00*	35.00*	38.00*	40.00*	43.00*	43.00*	.....	.....
Philadelphia	Southern Pine	30.00	31.00	32.00	32.00	33.00	34.00	36.00	.....	.....	36.00	42.00
	Douglas Fir	45.00	45.00	45.00	45.00	45.00	45.00	45.00	42.00	42.00	.....	.....
Pittsburgh	Southern Pine	30.50	31.90	37.65	33.75	36.52	37.50	47.75	.....	.....	57.50	57.50
	Douglas Fir	38.52	39.70	39.70	38.55	39.10	39.38	53.25	53.25	53.25	.....	.....
St. Louis	Southern Pine	30.00*x	31.00*x	31.00*x	29.50*x	30.50*x	31.00*x	47.00*x	.....	.....	72.00	70.00
	Douglas Fir	.....	.....	.....	.....	.....	.....	.....	55.00*x	55.00*x	.....	.....
San Francisco	Douglas Fir	20.50e	20.50e	21.00e	21.00e	21.50e	22.50e	22.00e	25.00e	25.00e	.....	.....
Seattle	Douglas Fir	15.50	15.50	15.50	14.50	14.50	14.50	21.00	20.00	20.00	.....	.....

*Delivered. †Spruce. ‡Long-leafed Y. P. §Norway Pine. ›Northern Pine. =Native. tAt ship's tackle. yYard prices. d10% Disc. taken off. x5M ft. or less SS4S. RRgh. eContractors in Minneapolis and St. Paul get 15% disc. from list.

CURRENT BUILDING AND CONSTRUCTION WAGE RATES PER HOUR

	Bricklayers	Carpenters	Structural Iron Workers	Hoisting Engineers	Plasterers	Common Labor — Building	Common Labor — Heavy Const.
Atlanta	$0.70/1.125	$0.40/.90	$0.60/1.25	$0.75/1.50	$0.60/1.00	$0.30/.40	$0.30/.40
Baltimore	1.25	1.10	1.37½	1.25	1.25	.45	.45
Birmingham	1.00	.60/1.00	1.00	1.125	1.00	.30/.40†	.30/.40†
Boston	1.30	.70/1.175	1.20	.90/1.175	1.375	.50/.70	.50/.70
Cincinnati	.80/1.375	.65/1.20	1.25	1.00/1.25	.80/1.375	.45	.45
Chicago	1.50	1.50	1.50	1.50	1.50	.95	.95
Cleveland	1.375	1.25	1.25	1.25	1.375	.82	.82
Dallas	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.50/1.00	.25/.40	.25/.40
Denver	1.10	1.10	1.10	.....	.....	.50	.50
Detroit	1.25	1.00	1.25	.75/.95	1.25	.55/.75	.55/.75
Kansas City	1.325	1.125	1.25	1.25	1.325	.70	.45/.50
Los Angeles	1.10	1.10	1.125	1.125	1.25	.50	.60
Minneapolis	1.00	.70/.85	1.00	.85	1.00	.40	.45/.50
New Orleans	1.00	.75	1.00	1.00	1.25	.30/.40	.30/.40
New York	1.50	1.40	1.475/1.65	1.50/1.5625	1.50	.82½	.50/.80
Philadelphia	.35/1.50	.65/1.10	.70/1.375	.90/1.00	1.10/1.37	35/50	.40/.50
Pittsburgh	1.00/1.50	1.00/1.25	1.00/1.375	1.00	1.00/1.50	.70	.50
St. Louis	1.50	1.25	1.47	1.35/1.47	1.50	.78¾	.35/.78¾
San Francisco	1.50*	1.125	1.37½	1.12½	1.25*	.62½	.60
Seattle	1.00	1.00	1.25	1.25	1.25	.60	.60
Montreal	.70	.60	.80	.55	.70	.35	.40

Skilled Avg: (Bricklayers, Carpenters, Ironworkers) $1.134 Common Avg. $0.552 *6-hr. Day. † PWA

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CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., Sacramento—City Council, H. G. Denton, clk., soon takes bids water storage reservoir at filtration plant. $40,000. Plans awaiting approval of P.W.A.

Mass., Cotuit—Town, Water Dpt., Town Hall, soon takes bids waterworks, incl. pumping equipment, elevated tank and about 7 mi. c.i. water mains. $150,000. Whitman & Howard, 89 Broad St., Boston, engrs. Noted Mar. 10, C. D. —Mar. 7, E. N.-R.

N. Y., Cold Spring Harbor—Cold Spring Fire Dist., election Apr. 3, on proposition to spend $3,500 for purchasing additional fire apparatus.

Pa., Altoona—City plans repairing flood damage to two of city's three watersheds, incl. flood channel at Kittanning Point Reservoir and same at Scotch Run sediment dam. $60,000. **Maturity soon.** H. J. Baum, City Hall, engr.

Pa., Morrisville—Council rejected bids Mar. 24, waterworks improvements. $39,000. Will readvertise. H. H. Lee, 333 North Pennsylvania Ave., engr. Noted Mar. 9, C. D.—Mar. 12, E. N.-R.

S. D., Rapid City—City election Apr. 26, $90,000 bonds, furnishing materials and constructing water system improvements, incl. drilling new well, laying pipe line $64,000, constructing pump house, etc. Total $100,000. H. W. Zolpher, city engr. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

BIDS ASKED

Ala., Lincoln—Apr. 10, by Town, constructing filter plant for new waterworks. J. B. McCrary Co., 22 Marietta St., Atlanta, Ga., engrs.

Ind., Clay City—Apr. 7, by City, constructing municipal water system, incl. 1 tubular or screened gravel walled drilled well; one motor driven deep well type turbine pump, with valves, connections; 1 chlorinator with accessories; 1 complete pumping station building; one 75,000 gal. elevated steel water tank on steel tower; 24,005 lin.ft. 2- to 8-in. bell and spigot pipe; twelve 4- to 8-in. valves and boxes; twenty-five 5 in. fire hydrants, one hundred fifty ⅝ in. service meters complete. $60,000. Weber & Jenkins, Brazil, engrs. Noted Oct. 8, C. D.—Oct. 10, E. N.-R.

Md., Towson—Apr. 13, by Comrs. Baltimore Co., Court House, excavating trenches, furnishing and laying 21,320 lin.ft. 6- to 12-in. watermains in various streets. S. A. Green, Towson, engr.

Mass., Athol—Apr. 9, by Bd. Water Comrs., Town Hall, Contr. 2, furnishing, laying 8,900 ft. c.i. water pipe and appurtenances, for Town. F. P. Hall, supt. Water Dpt. P.W.A. Project 1083-R, Contr. 2. Tighe & Bond, 189 High St., Holyoke, engrs.

Mass., Mansfield—See "Contracts Awarded."

Mass., Natick—See "Contracts Awarded."

Mass., Norwood—See "Contracts Awarded."

Mich., Detroit—Apr. 7, by E. H. Bauer, acting secy. Dpt. Water & Supply, furnishing, installing 8 in. high pressure corrugated steam piping for 2 main steam turbines with gate valves and accessories, also ¾ in. auxiliary steam pipe line. P.W.A. project. Geo. H. Fenkell, 735 Randolph St., Detroit, engr.

Minn., Onamia—Apr. 7, by village, W. J. Eynon, clk., furnishing, installing 11x114 ft. hollow tile, stucco pump house, pumping equipment. P.W.A. project. Druar & Milinowski, 830 Globe Bldg., St. Paul, engrs.

N. Y., Goshen—Apr. 16, by Village Trustees, Village Hall, venturi meter on intake main and equipment for No. 4 filter bed at water treatment plant, contr. 2. P.W.A. project. J. F. Kane, mayor; adv. E. N.-R. April 2.

N. Y., Newark—See "Contracts Awarded."

N. Y., Red Hook—Apr. 9, by Village, constructing Contr. C, laying pipe, building pumping station, and other buildings for waterworks. $63,892. P.W.A. project. M. Pirnie, 25 West 43rd St., New York, engr. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

†N. Y., West Point—Apr. 21, by Con. Q.M., United States Military Academy, West Point, installing filter plant additions; steel storage tanks and connections, electric driven centrifugal pumps and connections; adv. E. N.-R., Apr. 2. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

O., Berea—Apr. 13, by City, 4,000 ft. 6 in. and 1,000 ft. 4 in. c.i. or steel mains in Barrett Rd. R. F. MacDowell, Chester Twelfth Bldg., Cleveland, engr.

Ore., Jefferson—Apr. 10, by City, constructing new water system, replacing 4,000 ft. 6 in. and 9,000 ft. 4 in. mains of which 2,000 ft. must be laid under pavement, etc. Improvement possible through allocation federal funds. Noted Jan. 20, C. D.—Feb. 6, E. N.-R.

CONTRACTS AWARDED

★**Calif., Los Angeles** — Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., constructing Eagle Mountain Pumping Plant, Colorado River Aqueduct, to L. E. Dixon, 609 South Grand Ave., $819,316. Bids Mar. 13, awarded Mar. 27. Noted Mar. 17, C. D.—Feb. 6, E. N.-R.

Calif., San Diego—Consolidated Steel Corp., general contractors, 6501 Slauson Ave., Los Angeles, 57,000 yd. trench excav., 16,000 yd. roadway reconstruction excav., miscellaneous structures of concrete and steel in connection with construction of El Capital-Lakeside Pipe Line Project, La Mesa-Lemon Grove and Spring Valley Irrigation Dist., to V. R. Dennis Con. Co., 39-11 5th St., $90,000. Noted Mar. 4, C. D.—Mar. 12, E. N.-R., under "Contracts Awarded."

Calif., San Francisco—P. Utilities Comn., City Hall, laying 6 in. c.i. watermains in Pacheco St. between 11th Ave. and Aerial Way, to W. J. Tobin, 586 Howard St., $705. Bids Feb. 6. Noted Feb. 14, C. D.

Calif., San Francisco — Dpt. P. Wks., City Hall, constructing four 75,000 gal. rein.-con. fire cisterns in Dolores St., at intersections with 14th, 16th, 18th and 20th Sts., for City and San Francisco Co., to Eaton & Smith, 715 Ocean Ave., $25,442. Bids Mar. 4, awarded Mar. 16. Noted Mar. 12, C. D.—Feb. 27, E. N.-R.

Colo., Denver—Bd. Water Comrs., City, furnishing slow mixing and necessary equipment for use in West Side Filter plant, Moffat Tunnel Extension Project, filter building only, to Dutton, Kendall & Hunt, 816 East 18th Ave., $295,875•••filter equipment, to Roberts Filter Co., Darby, Pa., $168,790•••Contr. 5, pumping units, to American Well Wks., Aurora, Ill., $4,330•••mixing equipment, to Dorr Co., Inc., Cooper Bldg., $13,420. Grand total $482,415. **P.W.A.** Bids Mar. 17. Noted Mar. 24, C.D.—Mar. 5, E.N.-R.

Conn., Danbury—Danbury Waterworks Impvt. Comn., T. J. Bowen, secy. at City Clerk's Office, City Hall, Contr. A, constructing filtration plant and Contr. C, constructing pipe lines connecting 2 reservoirs and taking water to one filtration plant, to Tuller Constr. Co., 95 Monmouth Rd., Red Bank, N. J., $172,787 and $101,780 respectively. Est. $570,000. **P.W.A.** Bids Feb. 26. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

Ill., Mount Olive — City, water supply and treatment plant, Sect. A, and treatment plant, Sect. B, to J. C. McCormack, 3301 Morganford Rd., St. Louis, Mo., $90,843•••distribution mains and appurtenances, Sect. C, to Strubel & Helmick Constr. Co., Alton•••steel tank on tower, Sect. D, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago. Est. $115,000. **P.W.A.** Bids Mar. 3. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

Mass., Mansfield—Town, H. E. Everett, town mgr., Town Hall, replacing 4 to 5 mi. 6 in. and up c.i. watermains in Fuller Pl., Bella Vista, Winthrop, Columbus, Somerset, Shawmut, Summitt and Warren Aves., Davis, Eddy, Henry, Horace, Myrtle, Pratt, Dean, Fowler, Fulton, Newton, South Main, West, Aspen, Avon, Bristol, Campbell, Charles, Chestnut, Creedon, Hall, Chuney, Crocker, Coral, Branch, Gilbert, Otis, Swett, Jewell, Walnut, East, Balcom, Main, West, Linden, Shields, Summer, West Church, Willow and Hope Sts., day labor, $50,000 or more. Awaiting W.P.A. funds. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

Mass., Natick—Town, F. S. Sargent, supt. P. Wks., Town Hall, replacing old cement-lined pipe with c.i. water pipe in various streets, day labor. $25,000.

Mass., Norwood—Town, W. C. Kendrick, town mgr., waterworks maintenance and construction, day labor. $30,231. Appropriation made at Town meeting for year 1936.

Minn., Chicago City—Village, G. W. Palmer, clk., furnishing, installing 1 deep well turbine pump, etc., to Crane Co., of Minnesota, 356 Bway., St. Paul, $855. Bids Mar. 5. Noted Mar. 20, C. D.

Mo., Oak Grove—City, constructing distribution system, to Municipal Service Co., Dwight Bldg., Kansas City, $45,176; steel tank on tower, to Pittsburgh-Des Moines Steel Co., 1015 Southwest Tuttle St., Des Moines, Ia., $5,300. Est. $45,000. **P.W.A.** Bids Mar. 5 and 20. Noted Mar. 10, C. D.

Mo., Stockton—City, steel tank on tower for waterworks, to Pittsburgh-Des Moines Steel Co., 1051 Tuttle St., Des Moines, Ia. Est. $5,000. **P.W.A.** Bids Mar. 4. Noted Feb. 26, C. D.

Neb., Prague—City, fire hose for waterworks, to Eureka Fire Hose Co., 9th and Douglas Sts., Omaha, $530. **P.W.A.** Bids Dec. 13. Noted Dec. 6, C. D.

Neb., Stella — City, pipe line, Sect. 5, for waterworks, to G. J. Cernchlavek, Humboldt, $4,955. **P.W.A.** Bids Jan. 9. Noted Jan 30, C. D.

Neb., Swanton—City, waterworks, Sects. 2 and 3, to McWayne Cast Iron Pipe Co., Dierks Bldg., Kansas City, Mo., $5,800. **P.W.A.** Bids Jan. 16. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Nev., Mina—Town, general contract water system, to P. C. Clausen, 1173 Keeler Ave., Berkeley, Calif., $36,000. **P.W.A.** General contractor awarded contracts for hydrants, valves and boxes, to Rensselaer Valve Co., 55 New Montgomery St., San Francisco, Calif.•••pipe, to Crane Co., 1227 Front St., Sacramento, Calif. •••20,000 gal. storage tank, to L. Pigmer, Fallon. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

N. J., Andover—Boro, steel storage tank for water supply system, to Chicago Bridge & Iron Wks., 165 Broadway, New York, $4,840. **P.W.A.** Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

†N. Y., Bath—Veterans Bureau, Arlington Bldg., Wash., D. C., water softening system, to Hungerford & Terry, Clayton, N. J., $3,657. Bids Mar. 3. Noted Feb. 12, C. D.—Feb. 20, E. N.-R.

N. Y., Buffalo—See "Materials and Equipment."

N. Y., Glens Falls—Bd. Water Comrs., City Hall, dam, pumping station and pipe lines, to Kingsbury Constr. Co., 158 Main St., Hudson Falls. Est. $166,000. **P.W.A.** Bids Mar. 16. Noted Mar. 20, C. D.—Mar. 5, E. N.-R.

N. Y., Goshen—Village, replacing watermains in various streets, Contr. 1, to W. G. Fritz Co., Inc., 69 Main St., West Orange, N. J. Est. $50,884. **P.W.A.** Bids Mar. 24, C. D.—Mar. 12, E. N.-R.

N. Y., Newark — Village, rebuilding watermains, by relief labor. To exceed $23,000. **W.P.A.** J. E. Williamson, Federal Bldg., Elmira, procurement officer W.P.A., will purchase materials.

N. Y., Oswego—P. Simiele, general contractor, 163 Ross Park, Syracuse, excavation and foundations for waterworks, for City, to P. Raby Contg. Co., 3rd Ave., Oswego. **P.W.A.** Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

N. Y., Rome—Dpt. Mental Hygiene, State Office Bldg., Albany, water lines and sewers at Rome State School to Bruno Trumpoli, 251 Altamont Ave., Schenectady. Noted Mar. 24, C. D.—Feb. 27, E. N.-R.

N. C., Charlotte—See "Sewerage and Waste Disposal."

O., Cardington—Jennings Lawrence Co., engrs., Rowland Bldg., Columbus, constructing and installing watermains on Cardington Waterworks Project, Contr. 2, for City, to Whitney Bros. & Co., Charleston, W. Va., $50,926. Est. $54,000. **P.W.A.** Bids Mar. 20, awarded Mar. 25.

†Pa., Carlisle Barracks—Con. Q.M., 200,000 gal. elevated steel tank, to Tippett & Wood, Phillipsburg, N. J., $15,370. Bids Jan. 22. Noted Jan. 9, C. D.—Jan. 16, E. N.-R.

Utah, Ogden—City, constructing pipe lines, to connect new reservoirs with distribution system, replacing outlets on Reservoirs 1 and 2, by-pass connections around reservoirs and basins for draining reservoirs, Schedule 5, material, to Waterworks Equipment Co., 149 West 2nd South St., Salt Lake City, $33,500; labor, to Wheelwright Constr. Co., Ogden, $14,500. Est. $59,500. **P.W.A.** Bids Mar. 12. Noted Mar. 4, C. D.

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◆

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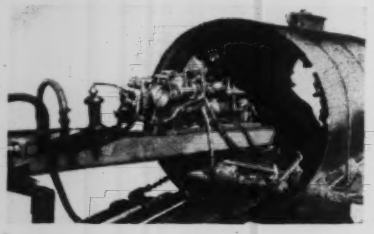

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Waterworks (Continued)

Wash., Tacoma—City, 16,333 ft. lock-joint concrete and 263 ft. steel pipe, to American Concrete & Steel Pipe Co., 459 East 15th St., $270,597; 2,512 ft. steel pipe, to Steel Pipe & Tank Co., Portland, Ore., $86,219. Noted Mar. 23, C. D.—Mar. 26, E. N.-R.

Ont., Kitchener—Water Comm., M. Pequegnat, supt., pumping replacements at Strange St. and Shoemaker Ave. waterworks buildings, pump only, to Goldie McCulloch Ltd., 64 Grand Ave., Galt. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

Ont., Kitchener—See "Sewerage and Waste Disposal."

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Carmel—Carmel Sanitary Dist. making surveys sewage disposal plant. To exceed $75,000. C. C. Kennedy, 74 New Montgomery St., San Francisco, and H. N. Jenks, 2701 Benevue Ave., Berkeley, engrs. Noted Oct. 11, 1934, C. D.—Oct. 18, 1934, E. N.-R.

★ **Ill., Belleville**—City bids in April or May, constructing activated sludge type sewage disposal plant, auxiliary piping and appurtenances, $434,545. P.W.A. project. J. G. Cooney, 3303 Rowand St., engr. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

Ill., Marengo—City, City Hall, rejected bids Mar. 12, constructing sewage disposal plant, complete with auxiliary piping and appurtenances, $41,000. V. H. Kasser, city engr. Noted Mar. 11, C. D.

Minn., Minneapolis — City, C. Swanson, clk., plans constructing municipal incinerator, new burner, smokestack, brick, construction, accessories, 28th Ave. and North Pacific Sts. $45,000. F. T. Paul, city engr.

N. Y., Buffalo—See "Contracts Awarded."

N. Y., Colonie (Sta. West Albany)—Town plans nearing completion and takes bids probably late in April, constructing sewerage system and sewage disposal plant. $245,000. P.W.A. project. Solomon & Keis, 267 Bway., Albany, engrs. Noted Oct. 8, 1935, C. D.—Oct. 10, 1935, E. N.-R.

N. Y., Rochester—City, Dpt. P. Wks., City Hall, plans constructing incinerator plant, on east side of Genesee River. $75,000.

N. Y., Rochester—City, Dpt. P. Wks., City Hall, plans rubbish incinerator plant, Falls St., west side Genesee River. $350,000. Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., engrs. Project temporarily in abeyance pending financing arrangements.

Pa., Altoona—City plans storm sewer and drainage project in South Altoona Section, requiring various sized pipe up to 54 inches, est. $75,000, about $8,000 to be expended for materials, may be financed by W.P.A.; plans repair and replacement of flood damaged sewers in various parts of city, $50,000 or more. City engineer compiling survey on estimate of cost. H. J. Baum, city engr.

Tex., Stratford—City, loan and grant for sewer line construction cancelled by P.W.A. on account of city being unable to finance its share of cost. $28,000.

Tex., Terrell—City plans for 18 mi. sanitary and storm sewer lines cancelled by P.W.A. because of litigation delaying construction. Est. $299,000. Noted July 19, 1934, C. D.—July 26, 1934, E. N.-R.

BIDS ASKED

Conn., Fairfield—See "Contracts Awarded."

Conn., Milford—Apr. 9, by Town, R. C. Stoddard, chn. Sewer Comn., Contr. B 2, another section of sewage disposal plant, P.W.A. project. Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., engrs. Noted Nov. 7, C. D.—Nov. 14, E. N.-R.

Conn., Willimantic—See "Contracts Awarded."

Ill., Chicago—Apr. 9, by Sanitary District of Chicago, 910 South Michigan Ave., constructing Upper Des Plaines Intercepting Sewer, Contr. 2, P.W.A. project.

Ky., Louisville—Apr. 30, by Comrs. Sewerage, J. H. Durham, chn., 400 Marion E. Taylor Bldg., furnishing, installing pumps and equipment at Point Sewage Pumping Station, Contr. 93, incl. three electric motor-driven, vertical-shaft sewage and storm water pumping units, with capacities of 4,500 g.p.m., 56,000 g.p.m. and 30,000 g.p.m. against 14 ft., 17.5 ft. and 29 ft., and other heads and 1 sump pumping unit of 150 g.p.m. capacity against a 17 ft. head, automatic lubricating system, control and electrical equipment, wiring and lighting, c.i. suction and discharge lines, gate valves and a hand operated crane of 10 tons or more capacity.

Mass., Framingham — See "Contracts Awarded."

Mass., Natick—See "Contracts Awarded."

Mass., Winchester—See "Contracts Awarded."

N. Y., Kingston—See "Contracts Awarded."

N. Y., Lockport—City taking bids constructing necessary buildings for incinerator plant, State Rd. $51,800. P.W.A. project. Nussbaumer & Clarke, Inc., 327 Franklin St., Buff., engrs.

O., Berea—Apr. 13, by City, trunk sewer [illegible] for sewage disposal plant, $30,000; Contr. [illegible] landscaping grounds, $4,000; Contr. 4, laboratory equipment, $1,000. P.W.A. project. [illegible] mer contracts rescinded. R. F. MacDow[illegible] Chester Twelfth Bldg., Cleveland, engr. No[illegible] Mar. 25, C. D.—Apr. 2, E. N.-R.

O., Columbus—Apr. 14, by P. W. Mact[illegible] engr., City Hall, constructing 6,000 ft. s[illegible] sewer in Oakland Park Dist., P.W.A. Contr. [illegible] Part 2, for City, $85,500. Noted Mar. 4, C[illegible] —Mar. 12, E. N.-R.

Wis., Kaukauna—Apr. 16, by City, constru[illegible] ing sewage disposal plant, $175,000. P.W[illegible] project. Bids Mar. 26, rejected. Greeley & Hansen, 6 North Michigan Ave., Chicago, [illegible] engrs. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

Wis., Milwaukee—Apr. 9, by Sewerage Com[illegible] furnishing, erecting 3 water walls for t[illegible] 784 hp. boilers, J. L. Ferebee, ch. engr.

Wis., Oshkosh—Apr. 7, by City, construct[illegible] intercepting sewers in High, South Bank a[illegible] North Bank Sts., South Lake Winnebago, No[illegible] Lake Winnebago and Lake Dr., R. Cramer & Sons, 647 West Virginia St., Milwaukee, en[illegible]

Ont., Kitchener—See "Contracts Awarded."

CONTRACTS AWARDED

Calif., Los Angeles—City, furnishing, insta[illegible] ing recording and control system at Terminal Island Sewage Treatment plant, San Pedro, to Newberry Electric Corp., 315 West 9th St., $12,471. Bids Jan. 22, awarded Mar. 25, No[illegible] Jan. 30, C. D.

Conn., Fairfield — Town, constructing storm sewers in Lenox Heights Sect. Owner buil[illegible] W.P.A. labor, $30,869. **W.P.A.** A. S. Hu[illegible] ington, Post Rd., engr.

Conn., Middletown—City, constructing 5,00[illegible] ft. South Interceptor, for new sewage disposal plant, to A. Brazos & Sons, Portland, $44,7[illegible] **P.W.A.** Noted Feb. 25, C. D.—Jan. 16, E. N.-R.

Conn., Willimantic—City, installing sanitary sewers in Jackson, Ash, Bolivia, North and Church Sts. **W.P.A.** labor, $23,500. J. F. Co[illegible] lins, City Hall, engr.

Ga., Atlanta—City, City Hall, South River Sewer, to A. P. Milam, Decatur, $8,990***; Sewer R, to W. P. Florence Constr. Co., Powder Springs, $4,600***sewer equipment No. 1, to Dorr Co., 247 Park Ave., New York, $67,8[illegible] ***sewer equipment No. 2, to Chain Belt Co., 1600 West Bruce St., Milwaukee, Wis., $9,05[illegible] ***sewer equipment No. 4, to Link Belt Co., 300 West Pershing Rd., Chicago, Ill., $3,140. Grand total $93,639. **P.W.A.** Noted Oct. 3, C. D.—Oct. 10, E. N.-R.

★ **Ill., Chicago**—Sanitary Dist. of Chicago, 910 South Michigan Ave., constructing Calumet Intercepting Sewer, Contr. 15, to A. J. Forschner Constr. Co., 52nd Ave. and 39th St., Cicero, $441,998. Bids Mar. 19. **P.W.A.** Noted Mar. 25, C. D.—Mar. 12, E. N.-R.

Ill., Chicago—Sanitary Dist. of Chicago, 910 South Michigan Ave., furnishing, delivering [illegible] low pressure heaters, 1 deaerating heater, 1 double effect evaporator with feed deaerating type heater and evaporator condenser, complete with auxiliary equipment, appurtenances, etc., to Schutte & Koerting, 105 West Adams St., $32,879. Rejected bids Feb. 27, furnishing 55,000 air diffuser plates. Noted Mar. 5, C. D.—Feb. 20, E. N.-R.

Mass., Braintree—See "Streets and Roads."

Mass., Dedham—See "Streets and Roads."

Mass., Framingham — Town, W. S. Walsh, town clk., sewer and drain construction, day labor, $50,000 appropriated.

Mass., Natick—Town, C. R. Bennett, chn. Bd. Selectmen, Town Hall, sewer department construction and maintenance, day labor, $26,412 appropriated.

Mass., Winchester—Town, E. C. Sanderson, chn. Water & Sewer Bd., Town Hall, extending vitr. clay sewer in Hillcrest Parkway, day labor. Est. $35,000.

Neb., Lawrence—City, constructing sewers, to Chambers Constr. Co., Lincoln, $25,350. Est. $34,545. **P.W.A.** Bids Feb. 18. Noted Feb. 11, C. D.—Jan. 16, E. N.-R.

N. Y., Bath—Village, 14 to 15 mi. sanitary and storm sewers, treatment plant, to W. J. Irwin Constr. Co., 276 Summit Ave., Buffalo, $90,975. **P.W.A.** Bids Mar. 14. Noted Mar. 23, C. D.—Feb. 27, E. N.-R.

N. Y., Buffalo—Buffalo Sewer Authority, City Hall, constructing Div. F, disposal plant and sewers, Michigan Ave. Dist., to W. J. Irwin Co., 276 Summit Ave., $109,718. **P.W.A.** Rejected bids Mar. 20. Div. G, Will readvertise. Noted Mar. 24, C. D.—Mar. 12, E. N.-R.

N. Y., Ithaca — Dpt. Health, State Office Bldg., Albany, sewers and water lines at Bigg[illegible] Memorial Hospital, to O'Connell Eng. Co., 63 Mount Hope Ave., Rochester. Noted Mar. 2, C. D.—Feb. 13, E. N.-R.

N. Y., Kingston — City, constructing storm water sewers with catch basins and manholes in Albany Ave. and sanitary sewers in Roosevelt Ave., $36,000; 5 and 8 in. sewers in Roosevelt, Jefferson and Manor Aves., $31,000, by relief labor. W.P.A. project. J. W. Carroll

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†*Federal Government*

sewerage, etc. (Continued)

Old Post Office Bldg., Albany, procurement officer, W.P.A., will purchase materials.

N. Y., New York—J. J. Lyons, pres. Bronx Boro, Bronx County Bldg., sewers in DeReimer Ave., to F.P.S. Contg. Co., 2883 Edington Ave. $126,736***Secor Ave., to A. Musumeeci, 277 East 146th St., $8,264***bridge in East 161st St., to Bronx Asphalt Corp., 900 Zerega Ave., $14,145. Grand total $149,145. **P.W.A.** Bids Mar. 12. Noted Mar. 13, C. D.—Mar. 5, E. N.-R.

N. Y., Tarrytown—Greenburgh Town Council, Tarrytown, extending Hartsdale District Sewer into Old Colony Ridge and development, to F. Bracalello, Scarsdale. D. C. Nolan, Jr., c/o Greenburgh Town Council, Tarrytown, engr.

N. C., Charlotte—City, constructing sewers, watermains, drains, etc., to W. A. Ebert, Latta Arcade, $61,851. **P.W.A.** Bids Feb. 25. Noted Mar. 4, C. D.

O., Akron—Firestone Tire & Rubber Co., 1278 South Main St., constructing 7 story, basement, 50x100 ft. incinerator and building, building, to J. B. Egan, 570 Wellesley Ave.; incinerator equipment, to More Bulger Destructor Co. Est. $100,000. Wilbur Watson & Associates, 4614 Prospect Ave., Cleveland, engrs. and archts.

O., Berea—City, Contr. 1, trunk sewer lines, to Philip Constr. Co., 4816 Brook Park Rd., Cleveland, $29,381; Contr. B, laboratory equipment and Contr. C, landscaping grounds, to Loesch & Green Constr. Co., 4311 West 32nd St., Cleveland, $5,140 and $1,735 respectively. Grand total $36,256. **P.W.A.** Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

O., Columbus—P. W. Maetzel, engr., constructing storm sewer extending in private property and Republic Ave. from McGuffey Rd. to Ontario St., and in Ontario St. and McGuffey Rd. from Republic Ave. to Hudson St. in Hiawatha St. and Osceola Ave. from Okola Ave. to Hudson St., in Hudson St. Dist., P.W.A. Contr. 65, Part 5, for City, to Boyd & Cooke, Union Trust Bldg., Dayton, $27,225. Est. $37,000. **P.W.A.** Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

O., Columbus—P. W. Maetzel, engr., City Hall, constructing 3,175 ft. storm sewer in Brookside Dr. from Main St. to James Rd., Bliss Dist., Contr. 58, Part 4, for City, to General Constr. Co., 3372 South High St., $59,707. Est. $75,000. Bids Mar. 24. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

Tex., Granbury—City, c/o A. B. Crawford, mayor, constructing sanitary sewers, incl. sewer mains, disposal plant, Imhoff Tank, chlorinators and sewage beds, to Klein & Lowe Constr. Co., 4617 Live Oak St., Dallas, $29,020. **P.W.A.** Bids Dec. 2. Noted Dec. 12, C. D.

Ont., Kitchener—Municipality, constructing 6 in. c.i. sewer in Argyll Ave. and 6 in. c.i. watermains in Belmont Blvd. and Argyll Ave., day labor. **Maturity in spring.** S. Shupe, City Hall, engr.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Arkansas—State Hy. Comn., Little Rock, rejected bids Mar. 19, 528 lin.ft. rein.-con. arch bridge over White River, Baxter Co., $140,000. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

Arkansas—See "Streets and Roads, under Bids Asked."

Calif., Oroville—City Council authorized S. J. Norris, city engr., to prepare plans for Montgomery St. extension bridge over Western Pacific R.R. tracks. $25,000 or more. W.P.A. to construct abutments in connection therewith.

Iowa—State Hy. Comn., Ames, soon takes bids constructing 60 ft. rein.-con. arch bridge; 1 rein.-con. box culvert extension on secondary road, north of Wayland, Washington Co., incl. 655 cu.yd. Class 1 and 165 cu.yd. Class 2 excav. F. R. White, ch. engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing two 27x42 ft. and one 44x42 ft., rein.-con., rigid frame bridge with two 5 ft. sidewalks, incl. 563 cu.yd. Class 1 excav., on Second St., in Des Moines, Polk Co., F. R. White, ch. engr.

Massachusetts—At request of Commissioner W. F. Callahan of Commonwealth of Massachusetts Dpt. P. Wks., Senator D. I. Walsh of Massachusetts is to introduce a bill in Congress providing authority for the Commonwealth to build and maintain 8 large bridges to replace those recently swept away by flood, located in following places, Central St., Lowell, Haverhill and Groveland, all foregoing over Merrimack River, between Montague and Gill, Deerfield and Sunderland, Northampton and Hadley, Holyoke and South Hadley, Springfield and Agawam, all over Connecticut River.

Mass., Southbridge—Town, J. La Fleche, chn. Bd. Selectmen, plans widening present rein.-con. bridge, Central St. $25,000. **Maturity indefinite.** J. C. Clark, town engr.

★ **Michigan and Ontario**—State Bridge Comn., H. Baird, chn., Port Huron, Mich., plans 1 span, 812 ft. steel arch bridge over St. Clair River, between Port Huron, Mich. and Point Edward, Ont. **Est. $3,000,000.**

Missouri, Iowa and Illinois—Wabash R.R. Co., E. L. Crugar, ch. engr., St. Louis, Mo., plans replacing or repairing bridge near Clifton, Mo., $8,120; 2 bridges near Buford, Mo., $34,941; near Orlando, Ill., $8,100; near Strahan, Ia., $10,400; near Neoga, Ia., $14,700; near Perey, Ia., $8,827; near Adelphi, Ia., $13,250; new bridge near Barry, $8,520; repairing bridge at Springfield, Ill., $9,450; drainage pipes in roadbed between Brunswick and Moberly, Mo., and near Sturgeon, Mo., $25,940. Total $138,158.

New Jersey—New Jersey-Pennsylvania Bridge Comn., Trenton, plans to rebuild stone piers of bridge across Delaware River, from Wilburtha, N. J., to Yardley, Pa., and repair piers of bridges at Lumberville, Riegelsville and Portland. L. Focht, State House, Trenton, engr.

New Jersey—E. D. Sterner, state hy. comr., Trenton, returned bids to have been opened Mar. 16, constructing bridge to carry Route 6, Sect. 7, over tracks of Bergen Co. branch Erie R.R. to contractors because of diversion of funds from highway department to relief. Noted Feb. 27, C. D.—Mar. 5, E. N.-R.

N. Y., Baldwinsville—New York State Dpt. P. Wks., Weighlock Bldg., Syracuse, plans constructing 225 ft. span bridge over Seneca River, to replace present structure damaged by flood. $75000. G. W. Pinck, c/o owner, engr.

N. Y., Coventry—Dpt. P. Wks., State Office Bldg., Albany, making plans constructing concrete underpass on Jefferson Branch, Delaware & Hudson R.R. to carry Binghamton-Albany State Hy. under tracks. To exceed $23,000. J. W. Donovan, c/o owners, dist. engr.

N. Y., Johnson City and Vestal—Dpt. P. Wks., State Bldg., Albany, plans concrete, steel bridge over Susquehanna River, connecting Johnson City and Vestal. $250,000.

N. Y., New Rochelle—Bd. Supervs. Westchester Co., County Bldg., White Plains, plans constructing overhead bridge at intersections of Hutchinson River Parkway, and proposed extension of Pine Brook Blvd. To exceed $23,000. Westchester Co. Parks Comn. has requested appropriation of $4,000 for preparing plans and making test borings. To be financed by owners.

North Carolina—State Hy. & P. Wks. Dpt., Raleigh, made application to U. S. War Dpt. for permit to construct fixed span bridge over Neuse River on U. S. Route 80 east of Kinston, Project 2562, Lenior Co. Bids at early date. To exceed 25,000. W. V. Baise, Raleigh, engr.

Tex., Edinburg—Hidalgo Co. soon takes bids constructing 5 rein.-con., steel county bridges on main hy. through Hidalgo Co. $300,000. H. P. Griffin, Edinburg, county engr. Bids for each bridge separately or 5 collectively. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

Washington—State Hy. Dpt., Olympia, survey under way for bridge over Columbia River, $300,000. L. V. Murrow, Olympia, engr.

Que., Quebec—Dpt. P. Wks., Quebec, O. Des Jardins, engr., takes bids in May, repairing Gouin Bridge. $100,000.

BIDS ASKED

†**Arizona and California**—Apr. 16, by U. S. Reclamation Service, Federal Bldg., Yuma, Ariz., constructing railroad bridge at Station 1029, highway bridge at Station 1035, and constructing Araz Wash overchute at Station 1042, of All American Canal, incl. 56,200 cu.yd. excav., 14,900 cu.yd. backfill. To exceed $23,000. R. B. Williams, Yuma, dist. engr.

Delaware—See "Streets and Roads."

D. C., Wash.—Apr. 22, by District Comrs., District Bldg., constructing overpass at Michigan Ave.

Kansas—See "Streets and Roads."

Louisiana—Apr. 15, by State Hy. Comn., Baton Rouge, constructing grade crossing over Chicago, Rock Island & Pacific R.R., on Winnfield-Alexandria Hy., Winnfield, Project 7352, WPGM 325, Winn Parish; grade crossing over N. O. T. and M. R.R. south of Lobdell, on Port Allen-Livonia Hy., Project 7050, WPGH 185-C, West Baton Rouge Parish; grade crossing over Louisiana & Arkansas R.R. and concrete approaches on Minden-Shreveport Hy., at McIntyre, Project 6954, WPGH 116-A, Webster Parish.

Louisiana—Apr. 15, by State Hy. Comn., Baton Rouge, constructing Bayou Black Bridge, 330 ft. long, 15 I-beam spans on creosoted timber pile bents with concrete caps on Vivian Rodessa Hy., Route 8, Caddo Parish.

Louisiana—Apr. 22, by State Hy. Comn., Baton Rouge, constructing overpass over Southern Pacific R.R., near Iowa Junction, on Fenton-Intersection Route 2 Hy., Project 3551, WPGH 55-B, Jefferson Davis Parish; overpass over Southern Pacific R.R. at Jennings, on Welsh-Mermentau Hy., Project 3550, WPGM 35-D, Jefferson Davis Parish; overpass over Southern Pacific R.R., east of Lake Charles on De Ridder-Lake Charles Hy., Project 1950, WPGH 217-B, Calcasieu Parish; constructing overpass over N. O. T. and M. R.R. on De Ridder-Lake Charles Hy., Project 1552, WPGH 62, Beauregard Parish; overpass over Southern Pacific R.R., west of Rayne, on Crowley-Rayne Hy., Project 1002, WPGH 315, Acadia Parish.

Missouri—Apr. 10, by State Hy. Comn., F. H. Cutler, ch. engr., Jefferson City, concrete, steel and timber bridges in Atchison, Ballinger, Boone, Cole, Clay, Cape Girardeau, Dallas, DeKalb, Dent, Iron, Jackson, Jasper, Madison, Marion, Mississippi, New Madrid and St. Louis Counties.

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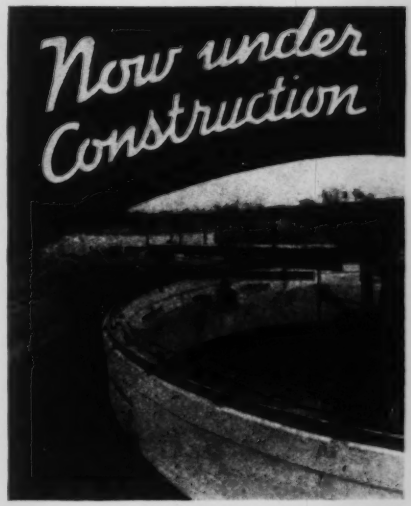
†*Federal Government.*



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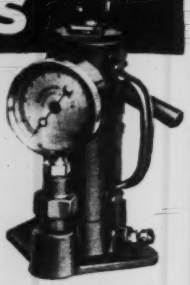

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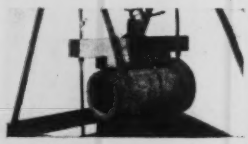
Blackhawk Hydraulic Jack Model D 11 G (12 ton) determining strength of concrete pipe.



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Bridges, etc. (Continued)

Mo., St. Louis—Apr. 24, by Bd. P. Serv., City Hall, constructing deck and track construction for municipal bridge across Mississippi River between St. Louis, Mo., and East St. Louis, Ill. P.W.A. project. C. E. Smith & Co., Railway Exch. Bldg., engrs. Noted Mar. 24, C. D.

Nevada—Apr. 15, by State Hy. Comn., Carson City, constructing concrete, steel underpass under Southern Pacific Ry. on West 2nd St., near Reno, incl. 20,883 cu.yd. excav. R. A. Allen, Carson City, state hy. engr.

Nevada—Apr. 18, by State Hy. Comn., Carson City, constructing steel, concrete underpass and concrete, steel bridge on Alameda and Wells Aves., Reno, incl. 26,446 cu.yd. roadway excav., 1,224 cu.yd. select borrow, 2,335 cu.yd. structural excav. R. A. Allen, Carson City, hy. engr.

New Hampshire—Apr. 9 by State Hy. Dpt., Concord, 2 bridges, approaches over railroad, Newfields and Newmarket, Rockingham Co. $116,000.

New Jersey—Apr. 13, by State Hy. Comn., Trenton, constructing extension to bridge and approaches carrying Route 25 across tracks of Pennsylvania R.R. at Kinkora, Burlington Co., incl. 35,112 excav., 65,000 lb. reinforcing steel; adv. E. N.-R., Apr. 2.

N. J., Belmar—Apr. 8, by Bd. Freeholders Monmouth Co., constructing bridge for crossing of Shark River Bridge W-43 at Ocean Ave. between Avon and Belmar, Ash, Howard, Needles & Tammon, 111 8th Ave., New York, consult. engrs. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

New York—See "Streets and Roads."

†**North Carolina**—Apr. 16, by Pub. Rds., Dpt. Agriculture, 1825 F St., N.W., Wash., D. C., constructing 3 stone rein.-con. bridges in Blue Ridge Parkway Alleghany Co., incl. 500 cu.yd. unclassified excavation for channel; 1,000 cu.yd. unclassified excavation for structures; 1,700 cu. yd. unclassified excav. for borrow. H. J. Spelman, dist. engr.; adv. E. N.-R., Apr. 2.

Pennsylvania—Apr. 9, at office of W. W. Van Dyke, secy., Hys., Harrisburg, rein.-con., steel viaduct, concrete pavement, etc., 8,978 ft. R-246, Sect. R-1, Jackson and Lancaster Twps., Zelienople Boro, Butler Co., involving 72,594 cu.yd. Class 1, 4,494 cu.yd. Class 2 and 6,820 cu.yd. borrow excav.; 3 span plate girder bridge, R-11, Kingston Borough, Luzerne Co., 662 cu. yd. Class 2 excav.

Virginia—See "Streets and Roads."

Ont., New Hamburg—Waterloo Co. Council bids about Apr. 30, constructing 125 ft., concrete, steel bridge over Nith River. $30,000. D. J. Emrey, Court House, Kitchener, engr. Noted July 8, C. D.—July 11, E. N.-R.

CONTRACTS AWARDED

Arizona—State Hy. Comn., Phoenix, constructing concrete underpass 1.5 mi. north of Cochise, to Lee Moor Contg. Co., 206 Two Republic Bldg., El Paso, Tex., $54,919. Est. $60,000. Bids Mar. 19. Noted Mar. 25, C.D.

Arkansas—State Hy. Comn., Little Rock, 110 lin.ft. rein.-con. overpass over M. O. P. R.R., Marion Co., to F. Luttijohn, Topeka, Kan., $9,679 est. $20,000. Bids Mar. 19. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

Arkansas—See 'Streets and Roads."

Indiana—State Hy. Comn., Indianapolis, constructing 1 span 41 ft. rein.-con girder bridge in Knox Co., to J. Voto, Clinton, $9,985 est. $10,511***7 span 224 ft. rein.-con girder bridge in Marshall Co., to Bontranger Constr. Co., 816 Indiana Ave., Elkhart, $92,232 est. $113,137*** 31 ft. steel beam bridge in Jackson Co., to R. H. King, Danville, $53,366 est. $56,380. Grand total $155,582. Bids Feb. 4. Noted Feb. 7, C. D.—Jan. 23, E. N.-R.

Indiana—State Hy. Comn., Indianapolis, 2 span, 101 ft., steel beam bridge over Bango Creek, St. Joseph Co., to J. A. Crosbie, Bluffton, $19,697. Est. $25,773. Bids Oct. 22. Noted Oct. 28, C. D.—Oct. 10, E. N.-R.

Kansas—See "Streets and Roads."

Kansas—State Hy. Comn., at office of County Clerk, Independence, Bridge 9.3, viaduct, continuous I-beam span, Project 69-12-WPGH, 5A, Bourbon Co., to J. A. Tobin Constr. Co., Douglass and Woodland Sts., Kansas City, Kan., $32,676. Bids Mar. 6. Noted Feb. 26, C. D., under "Streets and Roads."

Kansas—State Hy. Comn., Russell (**P. means Project**), Bridge 0.3, P. 21-16-WPMH 496-D, Graham Co., to M. W. Watson, Natl. Bank of Topeka Bldg., Topeka, $8,609***Bridge 1.7, P. 18-5-PWS-24, to W. B. Honska, Salina, $15,737***Bridge 0.6, P. 8-16-FA 520-B, to Geiger & Rutherford, Leavenworth, $10,463***Bridge 5.5, P. 8-16-FA 520-B, to G. Knutson, 3520 Main St., Kansas City, Mo., $58,247, all foregoing in Russell Co.***Bridge 1.1, P. 36-9-A-WPGH 345-F, Norton Co., to Omaha Steel Wks., 609 South 48th St., Omaha, Neb., $86,612. Grand total $179,668. Bids Mar. 13. Noted Feb. 26, C. D.—Mar. 5, E. N.-R., under "Streets and Roads."

Iowa—State Hy. Comn., Ames, constructing one 526 ft. bridge in Appanoose Co., to Des Moines Asphalt Paving Co., 2nd and New York Sts., Des Moines, $63,575; 1 box and 1 pipe culverts and 1 multiple span overhead cross- in Dubuque Co., to J. H. Hunzinger & Co., Davenport, $14,464. Bids Mar. 17. Noted Mar. 23, C. D.—Mar. 12, E. N.-R.

Mass., Pittsfield—Daniel O'Connell's Sons, Inc., general contractors, 480 Hampden St., Holyoke, 150 tons structural steel for reinforced concrete bridge at Pomeroy and Columbus Aves., to Phoenix Bridge Co., Phoenixville, Pa. Engr., City, A. B. Farnharm, comr. P. Wks., City Hall. Noted Mar. 11, C.D.—Mar. 19, E.N.-R. Noted under "Contracts Awarded."

Missouri—State Hy. Comn., Jefferson City, constructing Wabash Underpass and bridge over drain, St. Louis Co. to F. Schmitt Constr. Co., St. Louis, Bridge over Little Lead Creek, Linn Co., to W. J. Menefee Constr. Co., Sedalia. Bids Dec. 20 and Jan. 31. Noted Feb. 6, C. D.

New Hampshire—State Hy. Dpt., Concord, 165 ft. span, steel truss bridge and approaches, Hopkinton, Merrimack Co., to Kittredge Bridge Co., 44 Park St., Concord, $46,376. Est. $50,000. Bids Mar. 5. Noted Mar. 10, C. D.—Feb. 27, E. N.-R.

New Jersey—J. P. Burns, general contractor, Dumont, resurfacing steel for 2 state highway bridges on Route 6, Sect. 7, Bergen Co., for State Hy. Dpt., Trenton, to Concrete Steel Co., 2 Park Ave., New York. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

New Jersey—E. D. Sterner, state hy. engr., Trenton, constructing grade crossing elimination, Central Ave. R.R., to Richards & Gaston, Somerville, $199,062. Bids Mar. 16. Noted Mar. 23, C. D.—Mar. 26, E. N.-R.

N. Y., Franklinville—Rust Eng. Co., general contractors, Koppers Bldg., Pittsburgh, Pa., 250 tons structural steel for bridge at Napier Crossing for Pennsylvania R.R. Co., W. D. Wiggins, acting ch. engr., Broad Street Station, Phila., Pa., to American Bridge Co., 71 Bway., New York. Est. $30,000. Noted Feb. 19, C. D.—Feb. 27, E. N.-R.

N. Y., Newark—Walsh Constr. Co., general contractors, 466 Lexington Ave., New York, 115 tons structural steel for bridge, for Dpt. P. Wks., Albany, to Lackawanna Steel Constr. Corp., Walden Ave., Buffalo. Noted Feb. 17, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

N. Y., New York—Transit Comn., 270 Madison Ave., New York, reconstructing bridge carrying West 184th St. (Fordham Rd.) over Main Line and Putnam Div. tracks of New York Central R.R., University Heights Station, Bronx Boro, to Boudin Contg. Corp., 105 West 40th St., about $143,000. Bids Feb. 7. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

South Carolina — State Hy. Dpt., Columbia, 135 ft. rein.-con. bridge over Southern R.R. and 0.005 mi. plain concrete approaches, on Route 5, near Roddy, W.P.G.H. 71, York Co., to B. H. Martin, Easley, $30,908***64 ft. rein.-con., steel bridge under S. A. L. R.R. and earth type surfacing 0.226 mi. approaches on Route 98, W.P.G.S. 373, Marlboro Co., to F. A. Triplett, Chester, $19,231***28.6 ft. creosoted timber, rein.-con., structural steel bridge and 0.273 mi. bituminous surfacing approaches over Southern R.R., Route 22, near Winnsboro, W.P.G.S. 370-B, Fairfield Co., to C. Y. Thomason, Greenwood, $24,970***117 ft. rein.-con. bridge over Southern R.R. to U. S. Route 76 at Camp Fornance, W.P.G.H. 45-B, Richland Co., to J. W. Barnwell, Jr., Columbia, $19,925***170 ft. rein.-con. bridge over C. and W. C. R.R., on Route 101, near Woodruff, W.P.G.S. 398 C, Spartanburg Co., to W. L. Florence Constr. Co., Powder Springs, Ga., $16,366***140 ft. rein.-con. bridge over Southern R.R. on Route 22, at Silverstreet, W.P.G.M. 319, Newberry Co., to F. W. Lamotte, Columbia, $12,441***90 ft. rein.-con. bridge over B. U. C. R.R. on U. S. Route 176, Union, W.P.M. 403, Union Co., to Rickenbacker Constr. Co., Union, $14,466. Grand total $121,307. Bids Feb. 18. Noted Feb. 25, C. D.—Feb. 13, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, reconstructing Long King Creek Bridge, Hy. 45, Control 213-3-4, Polk Co., to W. S. Crawford Co., 4817 Montrose Dr., Dallas, $33,451. Est. $35,000. Bids Mar. 11. Noted Mar. 19, C. D.

West Virginia—State Rd. Comn., Charleston, constructing box culvert and approaches WPGS 258, Wetzel Co., to Holt, McConnell & Osborn, Canonsburg, Pa., $57,610. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

STREETS AND ROADS

BIDS ASKED

Arkansas—State Hy. Dpt., Little Rock, projected bids Mar. 19, concrete paving, rein.-con. overpass and rein.-con. bridge 0.5 mi. Parsgould-Marmaduke Rd., Greene Co., $60,000; drainage, gravel base, bituminous surfacing 2 mi. Mt. Home East and West Hy., Baxter Co., $40,000; grading, drainage, traffic service gravel surfacing 2 mi. Paragould-Marmaduke Rd., Greene Co., $60,000. State Hy. Dpt., Little Rock, did not receive bids Mar. 19, grading, drainage, bituminous surfacing 1.8 mi. Hardy-East Rd., Sharp Co., $40,000; grading, drainage, traffic service gravel surfacing 1.3 mi. Conway-South Rd., Faulkner Co., $25,000. Noted Mar. 9 and 13, C. D.—Mar. 12, E. N.-R.

California—Apr. 15, by State Hy. Comn., P. Wks. Bldg., Sacramento, grading roadway approach and roadway tunnel with portland cement lining and pavement 0.3 mi. hy. between

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†*Federal Government*

Streets and Roads (Continued)

Sausalito and Golden Gate Bridge, Marin Co.: grading, plant mix on crusher run base surfacing 1.4 mi. hy. between Waldo Point and Golden Gate Bridge, Marin Co. C. H. Purcell, P. Wks. Bldg., Sacramento, state hy. engr.

Calif., Arcadia—Apr. 17, by City Clerk, curbing, asphaltic premix or oil macadam paving various streets. To exceed $23,000. G. Watson, Arcadia, engr.

Calif., Santa Maria—City Council, taking bids improving Vine and McClelland Sts., etc., involving 44,062 sq.ft. 4 in., and 8,556 lin.ft. 4 in. concrete gutters, 6,363 lin.ft. concrete curbing, 838 sq.ft. concrete driveways, 208 sq.ft. concrete sidewalks, 241 lin.ft. curbing, (remove), 208 sq.ft. sidewalks (remove), V. Peterson, city engr.

Connecticut—At Office J. A. Macdonald, state hy. comr., Hartford, rejected bids Mar. 16, grading, drainage, work, 13,575 ft. Merritt Parkway, Stamford, $404,764. Will readvertise. Noted Mar. 23, C.D.

Conn., New Canaan—See "Contracts Awarded."

Delaware—Apr. 15, by State Hy. Dpt., Dover, grading, concrete widening 1.069 mi. North and South State St., Dover, Contr. 362; resurfacing, grading 1 mi. State St., Dover, Contr. 362A; addition to Dover Auto Repair Shop, Contr. 470; truck garage, Kiamensi, Contr. 475; sidewalk, Rehoboth Bridge, Contr. 477; grading, concrete paving, etc., 0.523 mi. Delaware St., New Castle, Contr. 478; County Bridge, Wilson Mill Dam-Rd. 182, Kent, Contr. 479.

Ill., Springfield—Apr. 13, by Dpt. P. Wks. & Buildings, Div. Hys., concrete paving 0.4985 mi. road, Sect. 8-CS, in Springfield.

Ia., Mason City—Apr. 9, by Cerro Gordo Co., graveling 23.5 mi. and grading 41.1 mi. secondary roads, P.W.A. project, R. E. Robertson, co. engr.

Kansas—Apr. 10, by State Hy. Comn., at office of County Clerk, Hays, earthwork, culverts, light type surfacing, bridging, concrete paving, sand graveling for cover material, 15.631 mi. hys. in Decatur, Norton, and Ellis Counties.

Kansas—Apr. 14, by State Hy. Comn. at office of County Clerk, Olathe, earthwork, culverts, light type surfacing, bridging, concrete paving 23.438 mi. hys. in Johnson, Leavenworth, Lyon, Osage and Wyandotte Counties.

Kansas—Apr. 17, by State Hy. Comn. at office of County Clerk, Clay Center, earthwork, culverts, light type surfacing, concrete paving, bridging 9.555 mi. hys in Chase and Clay Counties.

Kentucky — Apr. 10, by State Hy. Comn., Frankfort, high type surfacing 1.397 mi. Brownsboro Rd., Louisville, NRM 194-J-S, Jefferson Co.; roadside improvement Richmond-Lexington Rd., NRH 124-A-P1 (1935), Madison Co.; planting and minor construction for roadside improvement 0.452 mi. Fountain Ave., Paducah, NRM 154 F-P, McCracken Co.

Louisiana — Apr. 15, by State Hy. Comn., Baton Rouge, concrete paving 2.876 mi. Kinder LeBlanc Hy., Route 7, Project 1105-B, WPSS 293, Allen Parish; grading, gravel surfacing 2.95 mi. Rosefield-Antioch School Hy., Route 1012, Project 1061, La Salle Parish; 6.326 mi. Darrow-Sorrento Hy., Route 761, Project 792-A-1, Ascension Parish; 33 mi, Marrero Lafitte Hy., Routes 30, 1307 and 1235, Project 1173, Jefferson Parish.

†Md., Cheltenham — Yards & Docks, Navy Dpt., Wash., D. C., postponed bids to have been opened Mar. 25, grading, surfacing roads, pipe culverts, etc., at Naval Radio Station, Spec. 8169. New date not set as yet. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

Mass., Braintree—See "Contracts Awarded."

Mass., Brookline—See "Contracts Awarded."

Mass., Dedham—See "Contracts Awarded."

Mass., Easthampton — See "Contracts Awarded."

Mass., Framingham—See "Contracts Awarded."

Mass., Haverhill—See "Contracts Awarded."

Mass., Methuen—See "Contracts Awarded."

Mass., Natick—See "Contracts Awarded."

Mass., Norwood—See "Contracts Awarded."

Mass., Woburn—See "Contracts Awarded."

Mississippi — E. D. Kenna, dir. State Hy. Comn., Jackson, withdrew project from Mar. 31 bid letting for grading, drainage structures, gravel surface course paving 4.809 mi. Basefield-Prentiss Hy., Jefferson Davis Co., $68,000, P.W.A. project. Noted Mar. 23, C. D.

Missouri—Apr. 10, by State Hy. Comn., F. H. Cutler, ch. engr. Jefferson City, improving roads in Atchison, Ballinger, Boone, Cape Girardeau, Chariton, Clay, Dallas, Dade, DeKalb, Dent, Iron, Jackson, Jasper, Linn, Madison, Marion, Mississippi, New Madrid, Pettis, Phelps, Perry, Pike, Ripley, St. Clair and St. Francois Counties.

Neb., Omaha—See "Contracts Awarded."

New Hampshire—Apr. 9, by State Hy. Dpt., Concord, 4 in. on 5 in. gravel paving 1.91 mi. Central Rd., Warner and Sutton, Merrimack Co., 43,469 cu.yd. earth and 27,471 cu.yd. rock excav., $129,000; 4 in. on 9 in. gravel surfacing 0.61 mi. Deering Rd., Weare, Hillsboro Co., 2,363 cu.yd. earth and 143 cu.yd. ledge excav., $9,000; 4 in. on 4 in. gravel surfacing 1.04 mi. Brattle St., Webster, Merrimack Co., 1,186 cu. yd. earth and 193 cu.yd. rock excav., $7,500.

N. J., Spring Lake Heights — Mayor and Council plan sidewalk and curb along Route 4-N, 3,200 lin.ft., both sides of road for nearly a mile, $35,465. Boro share $5,003. C. W. Birdsall, 1700 F St., Belmar, engr.

★**New Mexico**—Apr. 9, by State Hy. Dpt., Santa Fe, grading, drainage, oil processing 8.286 mi. F.A.P. 107C, Rco, Dona Ana Co., $276,863***7.259 mi. W.P.H. 93-B, Colfax Co., $133,740***grading, drainage structures 8.195 mi. road W.P.M.G. 53, Torrance Co., $64,067 ***constructing 40 ft. concrete, steel viaduct, with concrete approaches excavation, embankment, etc., for Coal Ave. Viaduct W.P.G.H. 242-A, Albuquerque Co., *$338,775. Total $813,445.

New York—Apr. 14, by Dpt. P. Wks., Albany, brick paving 0.79 mi. road in Cattaraugus Co.; graveling 5.25 mi. road in Franklin Co.; 3.84 mi. road in Rensselaer Co.; 5.2 mi. road in Washington Co.; bituminous macadam paving 4.91 mi. Lewis Co.; paving 1.18 mi. road in Allegany Co.; 2.52 mi. Rensselaer Co.; constructing 109 ft. girder bridge and concrete paving 0.47 mi. road in Schenectady Co.; 24 ft. slab bridge, concrete approaches 0.09 mi. road in Suffolk Co. F. S. Greene, supt. P. Wks.; adv. E. N.-R., Apr. 2.

N. Y., Ausable—See "Contracts Awarded."

N. Y., Belmont—See "Contracts Awarded."

N. Y., Concord (mail Springville)—See "Contracts Awarded."

N. Y., Rome—See "Contracts Awarded."

N. Y., Sardinia—See "Contracts Awarded."

N. Y., Schoharie—See "Contracts Awarded."

N. Y., Sidney—See "Contracts Awarded."

N. Y., Willsboro—See "Contracts Awarded."

North Carolina—State Hy. Comn., Raleigh, rejected bids opened Mar. 17, concrete paving 0.54 mi. P. 1964, Washington Co.; 0.24 mi. P. 6155, Cabarras Co.; bituminous on concrete surfacing, structures 0.4 mi. P. 1965, Washington Co.; grading, structures 15.36 mi. P. 2749, Sampson-Johnston and Harnett Counties; structures, concrete base 0.11 mi. P. 7740, Forsyth Co.; grading, structures, traffic bound macadam surfacing 8.97 mi. P. 8681, Polk and Rutherford Counties; bituminous on concrete paving and concrete paving 0.62 mi. P. 9072, Buncombe Co. Will readvertise. Noted Mar. 23, C. D.

†North Carolina—Apr. 23, by Pub. Rds., 1725 F St. N.W., Wash., D. C., constructing 3.442 mi. road in Blue Ridge Parkway from Buck Gap to Big Laurel Mountain, Yancey and McDowell Counties, incl. 13,000 cu.yd. tunnel excav., H. J. Spelman, dist. engr.

★**Ohio**—Apr. 7, by J. Jaster, Jr., state hy. dir., Columbus, grading, drainage structures 3.355 mi. Sect. P, Mansfield Ashland Rd., Mifflin Twp., Richland Co.; constructing concrete arch culvert, stone faced bridge R1-42-163 over Fleming Falls Creek, constructing timber bridge on steel beams with concrete piles, abutments and piers, R1-42-179, over Black Fork of Mohican River, and constructing concrete bridge with steel beams, AS-42-01, over Brindle Run and roadside improvement, Ashland Co., $226,019; relocating, grading, draining, road stabilized with binder soil, calcium chloride 1.724 mi. part Sect. F-1 and Sect. F of Cambridge Coshocton Rd., State Hy. 349, State Route 76, WPSS 689-B, and constructing steel truss bridge 2 concrete approach spans on steel beams, MU-76-148, over Mills Creek at Marquand Mills, Coshocton Co., $214,564; grading, drainage structures, traffic bound material paving 0.814 mi. Beech City to Dundee and Reese Rds., Twp. Roads 62 and 447, $13,490; 0.802 mi. Winesburg-Dundee Rd., County Rds. 69-B and 71-C, $22,420; grading, drainage structures, traffic bound surface course paving 0.653 mi. Sect. B, Brewster Shanesville Rd., State Hy. 588, Route 93, $33,359; grading, drainage structures, brick, concrete paving 0.653 mi. part Sect. O, Wooster Dover Rd., State Hy. 414, U. S. Route 250, FAP 535-C, and constructing concrete bridge, continuous steel beams, TU-250-11, over South Fork of Sugar Creek, roadside improvement, $256,851, all foregoing Tuscarawas Co.

O., Cincinnati—Apr. 8, by Comrs. Hamilton Co., surface treatment 80 mi. various roads in Eastern and Cheviot Divisions, $38,310; 50 mi. various roads in Woodlawn Division, $23,095; 50 mi. various roads in Western Division, $23,095, all 16 ft. wide. E. A. Gast, Court House, engr.

Pennsylvania—Apr. 9, at office W. W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving 1.953 ft. University Ave., Phila., Philadelphia Co., involving 12,950 cu.yd. Class 1 and 16,522 cu.yd. borrow excav.; dual type paving, consisting of two 10 ft. outside lanes, rein.-con. paving, etc., 17,887 cu.yd. R-137, Sect. 13 and 13-A, Upper Macungie and Maxatawney Twps., Lehigh and Berks Counties, 163,259 cu.yd. Class 1, 2,177 cu.yd. Class 2, and 3,847 cu.yd. borrow excav.; dual type paving, 4 rein.-con. structures, etc. 26,582 cu.yd. R-297, Sects. 1 and 2, Lower and Upper Saucon Twps., Lehigh and Northampton Counties, 227,342 cu.yd. Class 1

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†*Federal Government.*

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Pa., New Castle—See "Contracts Awarded."

Pa., Scranton—See "Contracts Awarded."

Pa., Williamsport—See "Contracts Awarded."

Rhode Island—Apr. 6, by Bd. Contracts, Standards & Purchases, State and Providence Plantations, Providence, rein.-con. paving 3.414 mi. Putnam Pike, Smithfield and Glocester, Contr. 3506, WPH 85-B and 55-B, Providence Co.; 1.25 mi. Old Warwick Rd., Warwick, Contr. 3521, WPMH 96-A, Kent Co.

Virginia—Apr. 9, by Dpt. Hys., Richmond, rein.-con. paving 2 mi. Route 1, State Project 173-AW-3B2, Fed. Project FA-173, Chesterfield Co.; O. H. crossing Southern R.R., Route 29, WPGH 282-CB1, Fed. Project WPGH 282, Pittsylvania Co.; macadam MST 0.5 mi. O. H. crossing and bridge, Route 60, State Project WPGH 655-C2-B2, WPGMH 655-M1-B3, Fed. Project WPGMH 384-J, Amherst Co.; soil surface treating 0.6 mi. Route 39, State Project WPGS 502-E, Fed. Project WPGS 567-A, Charlotte Co.; macadam MST paving 2.5 mi. Route 250, State Project 722-C3, Fed. Project 7, Albemarle Co.; 0.07 mi. Route 234, State Project WPMS 1379-M1, Fed. Project WPMS 542-A, Manassas Co.; 0.2 mi. Route C-617, State Project WPGS 1384-C, Fed. Project WPGS 566-A, Clarke Co.; graveling 2 mi. Route 5, State Project WPSS 794-C, Fed. Project WPSS 539-B, Charles City; 0.3 mi. Route 10, State Project WPMH 1034-M3, Fed. Project WPMH 378-D, Hopewell Co.; macadam paving 7 mi. Route 11, State Project 789-C1, 2, 3, Fed. Project 27-100-536-D, Smyth-Wythe Co.; concrete base, bituminous type paving 0.5 mi. Route 29, State Project WPMS 1046-FG, Fed. Project WPMS 625-A, Danville Co.; macadam and bituminous treating intersection Route 501, 2.8 mi. Route 252, State Project WPSS 1095-A, Fed. Project WPSS 561-A, Rockbridge Co.; graveling 0.7 mi. and 2 bridges Route 201, State Project WPSS 1136-A1, B1, 2, Fed. Project 609-AB, Northumberland Co.; waste 0.2 mi. Route C692, State Project 1320-E, Fed. Project WPGS 570-A, Franklin Co.; local material 0.4 mi. Route C615, State Project WPGS 1321-D, Fed. Project 560-A, Roanoke Co.; bituminous surfacing 0.06 mi. Route 40, State Project WPMS 1335-M2, Fed. Project WPMS 616-A, Victoria Co.; 0.5 mi. rein.-con. bituminous type bridge Hunting Creek, Route 1, State Project WPMH 439R-EW1-1041A, Fed. Project WPMH 363-EB1, Fairfax Co.; 3.2 mi. macadam MST paving and bridge Route 3, State Project 510-A1B2, Fed. Project 318-F, Culpeper Co.; 87 ft. bridge Route 4, State Project WPSS 346-B1, Fed. Project WPSS 436-C, New Kent Co.; 741 ft. bridge and approaches, Route C629, State Project 1108-A2B1, 2, King Queen & King Wm. Counties.

Wis., Milwaukee—See "Contracts Awarded."

CONTRACTS AWARDED

Alabama—State Hy. Comn., c/o G. Scott, pres., Montgomery, grading, drainage, gravel surfacing 2.565 mi. WPSO 395, Lauderdale Co., to W. C. Shepherd, 347 Elizabeth St. N.E., Atlanta, Ga., $34.550***grading, draining, chert and concrete, steel bridge on 5.19 mi. WPSO 352-B, Lawrence Co., to Mitchell Bros., 3828 1st Ave. S., Birmingham, $100.129***asphalt paving 0.319 mi. Broad St., Selma, NRM 233-B, Dallas Co., to Carey-Reed Co., 3401 4th Ave. N., Birmingham, Ala., and Lexington, Ky., $28,149. Grand total $162,828. Bids Dec. 31 and Mar. 12. Noted Dec. 27, C. D.—Mar. 23, C. D.

Arizona—State Hy. Dpt., Phoenix, oiling 25.3 mi. road in Mohave Co., to E. L. Yeager, Phoenix, $140,669. Est. $165,000. Bids Mar. 13. Noted Mar. 27, C. D.—Mar. 5, E. N.-R.

Arizona—State Hy. Comn., Phoenix, grading, draining 3 mi. road in Apache and Navajo Counties, to Lee Moor Constr. Co., 206 Two Republics Bldg., El Paso, Tex., $52,715. Est. $113,000. Bids Mar. 10. Noted Mar. 19, C.D.

Arkansas — State Hy. Dpt., Little Rock, grading, drainage, rein.-con. and structural steel railroad underpass and concrete pavement 0.3 mi. Mansfield-Waldron Rd., Scott Co., to E. E. Barber Constr. Co., Fort Smith, $78,001 est. $80,000***grading, drainage, traffic service gravel surfacing 9 mi. Greenbrier-Centerville Rd. and 0.5 mi. Paparm North Rd., Hy. 65, Faulkner Co., to D. B. Hill, Little Rock, $31,730 and $14,305 respectively, est. $40,000 and $25,000 respectively***concrete paving 0.8 mi. Beebe-McRae Rd., Hy. 67, White Co., to A. C. Kennedy, Poyen, $18,775 est. $25,000*** grading, drainage, 4 untreated timber bridges and traffic service gravel surfacing 8 mi. Danville-Waldron Rd. West, Yell Co., to D. Keenan, Dardanelle, $26,627 est. $40,000***grading, drainage, rein.-con. and structural steel underpass, concrete paving 0.5 mi. East Main and Gunter Sts., in Siloam Springs S.W., Benton Co., to Q. I. Rodgers, Little Rock, $41,808 est. $60,000***430 ft. rein.-con. overpass and concrete paved approaches Maple St., Washington Co., to F. Luttjohan, 417 East 13th St., Topeka, $21,374 est. $40,000. Grand total $232,620. Bids Mar. 19. Noted Mar. 9, C. D.—Mar. 12, E. N.-R.

California — State Hy. Comn., Sacramento, grading, plant mixed surfacing 8.3 mi. hy. between Soledad and Gonzales, Monterey Co., to A. J. Raisch, Burrell Bldg., San Jose, $134,397***grading, applying road mix surface treatment and constructing timber bridge 4 mi. hy. between Eric and La Rose, Kern Co., to Teichert & Sons, P. O. Box 1113, Sacramento, $86,148***constructing shoulders, crusher run base and applying seal coat surface 16.6 mi. hy. between Antioch and Bordwell Hy., Contra Costa Co., to Frederickson & Westbrook, P. O. Box 138, Lower Lake, $33,4***plant-mixed surfacing and armor coat crusher run base surfacing 2.4 mi. hy. between Route 1 and Point San Quentin, Marin Co., to E. A. Forde, 640 Redhill Ave., San Anselmo, $21,995. Grand total $276,267. Bids Mar. 11, awarded Mar. 17. Noted Mar. 1, C. D.

California—C. H. Purcell, engr., State Hy. Dpt., 808 State Bldg., Los Angeles, grading, applying road mix surface treatment, culvert headwalls 2.8 mi. hy. Ventura Co., to C. F. Robbins, Glendale, $65,321***widening hy., paving widened strip with concrete 4.9 mi. hy. between Oxnard to Huenene Rd., Ventura Co., to J. E. Haddock, Pasadena, $67,525***grading, constructing bridge, removing existing bridge 20.6 mi. Calipatria-Imperial Rd., New River to point 2 mi. west of Calipatria, Imperial Co., to V. R. Dennis Constr. Co., 3911 5th Ave., San Diego, $209,845. Grand total $342,691. Bids Mar. 5. Noted Mar. 6, C.D.—Feb. 27, E.N.-R.

California—State Hy. Comn., P. Wks. Bldg., Sacramento, grading, bituminous treated crushed gravel or stone surfacing 1.5 mi. hy. in city of Eureka between south city limits and Wabash Ave., Humboldt Co., to Mercer-Fraser Co., 2nd and Commercial Sts., Eureka, $69,388. Bids Mar. 4, awarded Mar. 17. Noted Feb. 20, C. D.

Conn., New Canaan—Bd. Selectmen, improving 12 mi. Farm-to-Market Roads in New Canaan Dist. Owner builds, W.P.A. labor, $39,183. W. A. Bates, Darien, W.P.A. engr.

D. C., Wash.—District Comrs., District Bldg., constructing, paving Wisconsin Ave. from Massachusetts Ave. and River Rd., to Highway Eng. Co., 7th and T Sts., $92,000.

★ **Ill., Chicago**—Cook Co., to Pack Road Constr. Co., 5915 North Rogers Ave., improving 1.5 mi. Harlem Ave., $41,722; 3 mi. 167th St., $82,572; 2 mi. Palatine Rd., $51,134; 3.5 mi. Palatine Rd., $73,613; 3.9 mi. Palatine Rd., $75,471; 2 mi. Roberts Rd., $48,075; 4 mi. Sauk Trail, $93,849; 3.9 mi. Schaumberg St., $93,733***to Midwest Constr. Co., 1 North LaSalle St., 0.9 mi. Central St., $87,162; 0.9 mi. Narragansett Ave., $131,823***to Central West Constr. Co., Maywood, 1 mi. Crawford Ave., $122,483***to Municipal Paving Co., Oak Park, 1.3 mi. Crawford Ave., $147,809***to Pickus Eng. & Constr. Co., 38 South Dearborn St., 1.1 mi. Hibbard Rd., $74,504***to J. P. O'Keefe, Chicago Ridge, 1.5 mi. 25th Ave., $85,530***to Iroquois Constr. Co., 410 North Michigan Ave., 0.6 mi. Montrose Ave., $87,996. Grand total $1,297,476. P.W.A. Bids Mar. 11. Noted Mar. 5, C. D.—Mar. 12, E. N.-R.

Indiana—State Hy. Comn., Indianapolis, bituminous retread paving 1.904 mi. Rush and Henry Counties, to M. A. Kinsey & Co., Waterloo, $53,657. Est. $63,230. Bids Feb. 4. Noted Feb. 7, C. D.—Jan. 23, E. N.-R.

Indiana—State Hy. Comn., Indianapolis, bituminous retread paving 7.568 mi. road in Monroe and Brown Counties, to Rogers & Co., Bloomington, $276,989. Est. $345,058. Bids Dec. 17. Noted Dec. 19, C. D.—Dec. 5, E. N.-R.

Indiana—State Hy. Comn., Indianapolis, rein.-con. paving 1.766 mi. road in Vanderburgh Co., to W. D. Vogel, 1103 Merchants Bldg., Indianapolis, $85,138. Est. $97,192. Bids Mar. 3, awarded Mar. 25.

Indiana—State Hy. Comn., Indianapolis, stone surfacing 2.717 mi. Harrison Co., to Hart & Hart, Columbus, $58,629 est. $60,832***rein.-con. paving 3.158 mi. Clark Co., to Wilmore Paving Co., Middletown, O., $91,091 est. $104,253***8.247 mi. Warren Co., to M. A. Hinsey & Co., Waterloo, $53,860 est. $58,206***bituminous retread paving 12.041 mi. Huntington and Wells Counties, to Middle West Roads Co., 421 Illinois Bldg., Indianapolis, $178,149 est. $213,691. Grand total $381,729. Bids Mar. 3. Noted Mar. 6, C. D.—Feb. 20, E. N.-R.

Iowa—State Hy. Comn., Ames, grading 0.47 mi. road Appanoose Co., to Green Constr. Co., 1201 Capitol Theatre Bldg., Des Moines, $32,070***0.246 mi. Dubuque Co., to Baker & Patton, Cedar Rapids, $10,373***paving same road, to Western Asphalt Paving Corp., Sioux City, $12,670***paving 0.594 mi. Polk Co., to Amodeo Paving Co., Des Moines, $18,165*** 8.873 mi. road in Monona Co., to J. Schumacher, Danecroft, $14,111. Grand total $87,389. Bids Mar. 17. Noted Mar. 23, C. D.—Mar. 12, E. N.-R.

Ia., Orange City—Sioux Co., to M. J. Van Wyk, aud., 896,000 cu.yd. side cast excav., to I. Van Buskirk, Hawarden, Ia., $24,666. Bids Mar. 24 rejected.

Kansas—State Hy. Comn., at office of County Clerk, Independence, (**P. means Project**), to B. H. Cotter, Pittsburg, earthwork and culverts 0.127 mi. P. 69-12-WPH 5A, $6,808; 0.271 mi. WPGH 5A, $25,779; 0.252 mi. P. 69-12-WPGH 5B, $17,974, all foregoing in Bourbon Co.*** to P. McGlone Constr. Co., City Bank Bldg., Kansas City, Mo., concrete paving 3.672 mi. P. 75-5-FA 23A, Part 1, Montgomery Co., $92,691 ***to M. W. Watson, Natl. Bank of Topeka Bldg., Topeka, sand gravel surfacing 2.361 mi. P. 50S-37-FA 470 A, Coffey Co., $3,974***to

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†*Federal Government.*

Streets and Roads (Continued)

Chandler Landscape and Floral Co., 101 West 47th St., Kansas City, Mo., roadside improvement 2.156 mi. P. 75-16-WPH 402 F. Coffey Co., $2,394***to Sutton Nursery & Landscape Co., Independence, roadside improvement 1.224 mi. P. 54-36-WPH 367 H, $2,458; 0.78 mi. P. 54-36-WPH 367 G, $991, both Allen Co.*** to Tri-State Constr. Co., Pittsburg, resurfacing 8.3 mi. P. 96-30-6715, $1,967; 1.5 mi. P. 31-6716, $356; 7.2 mi. P. 34-1-6717, $1,706, all foregoing in Wilson Co. Grand total $157,098. Bids Mar. 6. Noted Feb. 26, C. D.

Kansas—State Hy. Comn. at office County Clerk, Kansas City, Mar. 11, (**P. means Project**), to Imperial Constr. Co., Leavenworth, sand gravel surfacing 2.841 mi. P. 50S-38-FA 470 B, $4,270; 1.877 mi. P. 50S-38-FA 470 C, $2,822; 3.138 mi. P. 50S-38-FA 470 C, $4,716; 3.369 mi. P. 50S-38-FA 470 E, $5,063, all foregoing Osage Co.***to Perry McGlone Constr. Co., City Bank Bldg., Kansas City, Mo., earthwork 5.522 mi. P. 30-3-WPMS 476 C, Wyandotte Co., $198,301***to Holsinger Nursery Co., 24th St. and Merriam Blvd., Kansas City, Kan., roadside improvement 3.604 mi. P. 10-13-WPH 315-H, Douglas Co., $3,598***to Sutton Nursery & Landscape Co., Independence, 2.529 mi. P. 59S-32-WPH 30 AK, Lyon Co., $2,058***to Brosnahan Bros City Bank Bldg., Kansas City, Mo., earthwork and culverts 1.864 mi. P. 63-5-WPSS 466 C, Nemaha Co., $17,706***to M. Hasse, Kansas City, Mo., 0.538 mi. P. 73-35-WPGH 265 A, Brown Co., $22,234***to R. G. Aldridge, 1609 Nebraska St., Kansas City, light type surfacing 0.538 mi. P. 73-35-WPGH 265 A, Brown Co., $1,140***to O. H. Schmidt, Inc., St. Joseph, Mo., Bridge 4, 50 ft.-60 ft.-50 ft. spans, P. 73-35-WPGH 265 A, Brown Co., $16,629. Grand total $278,537. Bids Mar. 11. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

Kansas—State Hy. Comn., Russell (**P. means Project**), roadside improvement 0.749 mi. P. 21-18-WPH 496-A1, and 0.192 mi. P. 21-18-WPMH 496-A 2, both in Norton Co., to Cook Gardens, Ottawa, $954 and $312 respectively ***0.189 mi. P. 8-19-WPMH 170-E and 1.586 mi. P. 8-19-WPH 520-A, both in Osborne Co., to Lawson Landscape Service, McPherson, $598 and $1,898 respectively***earthwork, culverts, curbing, guttering 5.019 mi. P. 8-16-FA 520 B, Russell Co., to List & Clark, Railway Exchange Bldg., Kansas City, Mo., $121,507***0.487 mi. P. 21-16-WPMH 496 D, Graham Co., to M. W. Watson, National Bank of Topeka Bldg., Topeka, $13,106***earthwork and culverts 0.468 mi. P. 36-9 A-WPGH 346 F, Norton Co., to I. Rogers, Norton, $48,638***resurfacing 2.4 mi. P.D. 36-5-8093, Rawlins Co., to San Ore Constr. Co., McPherson, $1,282***sand gravel-ing for cover material 9.2 mi. P. 40S-12-6724, Russell Co., to Chas. Hulme, Great Bend, $1,830 ***16.4 mi. P. 40S-9B-6721, Trego Co., to D. H. Hardman, Alton, $3,753. Grand total $193,878. Bids Mar. 13. Noted Feb. 26, C.D. —Mar. 5, E.N.-R.

Maryland — State Roads Comn., Baltimore, bituminous Spec. "C" on macadam paving 1.6 mi. Contr. F-257-1-52, F.A.P. N.R.S. 363, Frederick Co., to F. J. Byron, 6701 York Rd., Baltimore, $36,902. Bids Mar. 10. Noted Mar. 16, C. D.

Maryland—State Roads Comn., gravel paving 2.73 mi. Contr. CH-159-1-82 F.A.P. W.P.S.O. 387, Charles Co., to Pembroke & Gasparovic, Park Hall, $39,351; stabilized earth surface course paving 2.66 mi., Contr. F-269-52, F.A.P. W.P.S.O. 395, Frederick Co., to M. J. Grove Lime Co., Lime Kiln, $27,564 Bids Mar. 17. Noted Mar. 20, C. D.—Mar. 12, E. N.-R.

Mass., Braintree—Town, A. E. Roberts, chn. Bd. Selectmen, highway department, construction and maintenance, $76,607; sewer department maintenance, $20,200, day labor. Funds appropriated at town meeting.

Mass., Brookline — Town, bituminous macadam paving in Hallwood Rd., day labor. $25,-000. D. A. Lacy, Town Hall, supt. of Streets.

Mass., Dedham—Town, T. T. Doggett, Jr., chn. Bd. Selectmen, Town Hall, bituminous macadam or asphalt paving in Central St., $3,000; Madison St., $5,000; Highland Ave., $3,500; Woodlawn St., $3,000; Marlboro St., $3,000; Boulevard Rd., $5,000; Milton St., $6,000; Louise and Bonham Rds., $3,500; sewers in East St., $5,000; Madison St., $5,-000, day labor. Grand total $42,000.

Mass., Easthampton—Town, F. Smith, chn. Bd. Selectmen, bituminous macadam resurfacing, concrete curbing Maple St., $25,000; 1 span rein.-con. bridge over Mahan River, Glendale St., $21,000, day labor.

Mass., Framingham—Town, W. S. Walsh, town clk., hy construction, day labor. $40,000 appropriated. S. Dyer, town engr.

Mass., Haverhill — City, G. E. Dalrymple, mayor, H. E. Presott, comr. P. Wks., City Hall, general repairs, reconstructing and resurfacing various streets, day labor. $115,000. **W.P.A.**

Mass., Methuen—Town, J. Austin, supt. Hy. Dpt., Town Hall, bituminous macadam reconstruction in Lowell St. $15,000; various streets $40,000, day labor.

Mass., Natick—Town, F. S. Sargent, supt. P. Wks., reconstructing and resurfacing Union and North Main Sts., $15,000; reconstructing, drain and resurfacing Pleasant, School and Pond Sts., $10,000; resurfacing existing sidewalks in various streets, $7,000, day labor. Grand total $32,000.

Mass., Natick—Town, C. R. Bennett, chn. Bd. Selectmen, Town Hall, hy. construction and maintenance, day labor. $67,908 appropriated.

Mass., Norwood—Town, W. C. Kendrick, town mgr., hy. maintenance, $29,000; sidewalk construction, $4,000; hy. resurfacing $6,500; highway construction, incl. Nanhautan Street extension, $15,000, day labor. Grand total $58,-500. Appropriations made.

Mass., South Hadley—Town, Bd. Selectmen, Town Hall, tar and gravel surfacing 10 mi. various streets, to Daniel O'Connell's Sons, Inc., 480 Hampden St., Holyoke, $33,550. **P.W.A.** Bids Feb. 17, awarded Mar. 18. Noted Feb. 24, C. D.

Mass., Woburn—Bd. P. Wks., City Hall, bituminous macadam paving Montvale Ave., day labor. Est. $54,000. E. W. Kenny, mayor chn. of Bd. P. Wks.

★**Michigan** — State Hy. at Roosevelt Hotel, Lansing, grading, drainage, concrete paving 0.788 mi. F-34-3C-2, village of Portland, Ionia Co., to D. D. Batties, Grand Rapids, $70,323*** 5.194 mi. F-9-1C-2 and 3, Bay Co., to James A. McKay & Sons, 16549 Woodward St., Detroit, $216,373***sheet asphalt on concrete paving 0.656 mi. hy. and brick, concrete with sheet asphalt paving 0.91 mi. F-50-31C-2 and F-50-32C-1, Mt. Clemens, Macomb Co., to Detroit Asphalt Paving Co., 702 Transportation Bldg., Detroit, $77,528***grading, drainage, surfacing with 40 ft. concrete base 0.656 mi. F-50-31C-1 Macomb Co., to R. D. Baker Co., Royal Oak, $50,623. Grand total $414,848. Bids Feb. 27. Noted Mar. 4, C.D.

Minnesota—State Hy. Dpt., St. Paul, paving 0.7 mi. State Project 60-16-27D, F.A.P. 452-B in Butterfield, and 1.1 mi. S.P. 60-16-29C, F.A.P. 452-A, in Mountain Lake, to Fielding & Shapley, 814 Guardian Bldg., St. Paul, $21,194 and $29,941 respectively***0.8 mi. S.P. 63-50-27-2, in Stewartville, to Hallett Constr. Co., Crosby, $32,812***7.8 mi. State Project 17-17-29-A1, B and C and S.P. 17-17-29-2A, B and C, WPGH 571-A, WPH 571-B, WPMH 571-C, WPM 78-B, WPGH 78-C and WPGM 78-D, between Cottonwood and Hanley Falls, to R. P. Englund and L. Shipman, Sleepy Eye, $48,392. Grand total $132,339. Bids Mar. 8. Noted Feb. 27, C. D.

Miss., Meridian—City, resurfacing 2,600 lin. ft., brick pavement, covering approximately 38,000 sq.yd., also grading, drainage and bridge repairs on several streets financed by Works Progress Administration, relief labor, $72,000. **W.P.A.** Approximately 1,200 tons Alabama rock asphalt required on project has been purchased from J. E. Wright Constr. Co., Meridian. J. E. Watts, Meridian, engr.

Missouri—State Hy. Dpt., Jefferson City, to W. J. Menefee Constr. Co., Sedalia, grading 4.717 mi. Lincoln Co., $31,686***to Kelly & Underwood, Granby, 3.274 mi. Newton Co., $16,689 ***to F. T. O'Dell Constr. Co., Hannibal, 4.873 mi. Miller Co., $19,348***to F. Schmitt Constr. Co., Inc., St. Louis, 0.072 mi. St. Louis Co., $107,574***to O. O. Fuller Constr. Co., Nevada, 3.9 mi. Bates Co., $10,948***to C. W. Rose, Brookfield, 1.338 mi. Putnam Co., $9,945; 4.849 mi. Putnam Co., $21,385; 3.754 mi. Putnam Co., $21,843. Grand total $239,419. Bids Dec. 20 and Jan. 31. Noted Dec. 13 and Feb. 6, C. D.

Mo., Clayton—City, to Webb Boone Paving Co., 5103 Fyler Ave., St. Louis, paving north and south alley southward to South Rosebury, $1,774; north and south alley northward to North Rosebury, $1,400; east and west alley southward to South Rosebury, $2,757; east and west alley northward to North Rosebury, $2,639; grading, concrete paving Northwood St., east city limits to DeMun, $2,784; both sides Southwood, east city limits to DeMun, $2,954; Beminsgon Ave., Forsyth to Maryland Sts., $8,194; both sides Northbury Ave., east city limits to DeMun, $2,902; and South Rosebury Ave., east city limits to DeMun, $1,511. Grand total $29,915. **P.W.A.** Bids Feb. 25. Noted Mar. 5, C. D.

★**Neb., Omaha**—City, grading 11 blocks main highway south to new South Omaha Bridge, all of Missouri Ave. from 13th to 24th Sts., $300,000; relaying brick pavement for 4 lane traffic, 13th St. from Howard to L Sts., about $300,000; constructing 9.52 mi. concrete sidewalks in various streets, $36,000, day labor. Total $636,000. W.P.A. Procurement Div. W.P.A., Lincoln, will purchase materials.

Neb., Omaha—Douglas Co., constructing permanent sidewalks along main highways out from Omaha in Douglas Co., relief labor. Est. about $43,000. **W.P.A.** project. Procurement Div., Lincoln, will purchase materials.

N. J., Trenton—City, to Union Paving Co., Broad and Stiles Sts., Phila., Pa., asphalt paving Hamilton Ave., $56,297; Front St. from Willow to Broad Sts., $19,471; Front St. from Broad to Montgomery Sts., $11,302***to Eastern Asphalt Co., Pennsylvania Bldg., Lalor St., $11,986***to P. DiAntonio, 224 East Hanover St., granite block paving South Clinton Ave., $8,204. Grand total $50,963. Est. $107,260. **P.W.A.** Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

†**New Mexico**—Pub. Rds., Denver, Colo., crusher run surfacing 18.575 mi. road in Otero Co., to Dudley Stone Products Co., 2101 San Diego St., El Paso, Tex., $58,156. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

N. Y., Ausable — Village, grading, ditching, trimming slopes, graveling 2.3 mi. road from McCombers Corners to Harkness, relief labor. To exceed $20,000. **W.P.A.** J. F. Leeds, South

†*Federal Government.*

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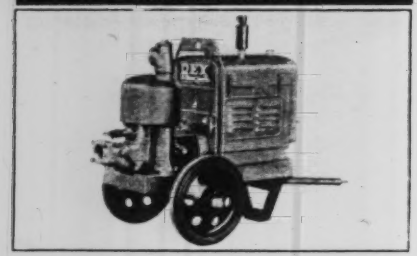

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MODEL 160 DITCHER
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THE BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO

Streets and Roads (Continued)

Street School, Glens Falls, procurement officer W.P.A., will purchase materials.

N. Y., Belmont—Bd. Supervs, Allegany Co., Belmont, gravel and bituminous surfacing 15 mi. base and 7 mi. top on county highways, relief labor. $152,000. **W.P.A.**

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro. Boro Hall, to B. Turecamo Contg. Co., New Cropsey Lane, paving Brighton 4th St. $7,914; Cleveland St. $5,110; East 46th St. $6,729; Narrows Ave. $3,008; West 3rd St. $10,712; West 6th St. $4,077; bituminous macadam paving Emmons Ave. $13,856; Emmons Ave. $25,818***to G. Alfieri, 188 Ainslie St., regulating Batchelder St. $1,265***to Mill Basin Asphalt Corp., East 54th St. and Avenue U, asphalt paving Canton Ave., $9,662; Emmons Ave. $14,024. Grand total $102,175. **P.W.A.** Bids Mar. 4. Noted Mar. 6, C. D.—Feb. 27, E. N.-R.

N. Y., Brooklyn—R. V. Ingersoll, pres. Brooklyn Boro, Boro Hall, to Turecamo Contg. Co., New Cropsey Lane, asphalt paving Decatur St. $11,986; South 4th St. $8,323; Sandford Ave. $7,145; 8th Ave. $22,292; 8th St. $7,864. Grand total $57,610. Bids Mar. 11. Noted Mar. 12, C. D.—Mar. 5, E. N.-R.

N. Y., Concord (mail Springville)—Village repairing and guttering 14 mi. White Rd. and Crane Rd., relief labor. $46,000. **W.P.A.** H. F. Burd, 1014 City Hall, Utica, procurement officer W.P.A. will purchase materials.

N. Y., Rome—Rome Twp., improving 295 mi. roads, incl. landscaping, ditching, grading, 20 culverts, reflooring 5 bridges, day labor. $44,514. **W.P.A.**

N. Y., Sardinia—Village, repairing, guttering, surfacing Domes-Miln Rd., Grove and Lake Sts., relief labor. $23,000. **W.P.A.** H. F. Burd, 1014 City Hall, Buffalo, procurement officer W.P.A., will purchase materials.

N. Y., Schoharie—Schoharie Co., constructing 3.4 mi. roads in Blenheim; 2.3 mi. Carlisle; 3 mi. Esperance; 4 mi. Gilboa; 3 mi. Jefferson; 2.3 mi. Middleburgh; 0.9 mi. Richmondville; 2.3 mi. Schoharie; 5 mi. Seward; 4.2 mi. road in Sharon; 4.6 mi. Summit, by relief labor. $189,905. **W.P.A.**

N. Y., Sidney—Village, constructing village road from Niles Farm to Masonville town line; Franklin Depot Rd., and Pine Hill Rd., relief labor. Est. about $25,000. **W.P.A.** A. Calabrisi, Telephone Bldg., Binghamton, procurement officer W.P.A., will purchase materials.

N. Y., Willsboro—Village, repairing, guttering, paving 1 mi. West Rd. crossing from D. & H. R.R. crossing in Wellsboro to Reber town line, relief labor. $25,000. **W.P.A.** J. F. Leeds, South Street School, Glens Falls, procurement officer W.P.A., will purchase materials.

North Dakota — State Hy. Dpt., Bismarck, graveling 7.313 mi. roads Burke Co., and grading 10.813 mi. Ward Co., to Butler Constr. Co., Grand Forks, $15,454 and $15,264 respectively ***grading, structures 6.054 mi. Foster Co., to Archie Campbell, Warwick, $29,220***grading 6.033 mi. McLean Co., to John Coghlan, Rolla, $30,448***structural work 2.599 mi. Eddy Co., to J. A. Jardine Bridge Co., Fargo, $22,467. Grand total $112,853. Bids Mar. 20, awarded Mar. 21. Received no bids Mar. 20, improving roads in Oliver and Stutsman Counties, will readvertise. Noted Mar. 26, C. D.—Mar. 12, E. N.-R.

Oklahoma—State Hy. Dpt., Oklahoma City, grading, drainage 3.8 mi. roads in Grady Co. and 3.3 mi. Custer Co., to R. Mullins, Inc., Petroleum Bldg., Oklahoma City, $18,136 and $37,978 respectively, est. $20,000 and $39,000 respectively***2.1 mi. Harper Co. and 1.8 mi. Cotton Co., to Lee Pool & Sons, Fairview, $13,162 and $14,688 respectively, est. $15,000 and $16,000 respectively***4.7 mi. Johnston Co., to G. A. Nichols Co., 115 North Harvy St., Oklahoma City, $34,401 est. $36,000***0.42 mi. Tillman Co., to Park Ward Co., 808 East 17th St., Oklahoma City, $8,174 est. $10,000 ***6.9 mi. McClain Co., to Joyce Long Constr. Co., Key Bldg., Oklahoma City, $34,799 est. $36,000***2.1 mi., road in Cherokee Co., to T. C. Ottinger, Hinton, $31,633 est. $34,000. Grand total $192,071. Bids Mar. 24. Noted Mar. 17, C. D.

Oregon — State Hy. Comn., Salem, grading 2.17 mi. Bear Creek-Bare Mt. Summit, Sect. Wolf Creek Hy., to J. A. Lyons, 3305 North Hasley St., Portland, $110,050; constructing 2 artificial roadside oasis near Castles Rock and Boardman on Columbia Hy., Morrow Co., to O. N. Pierce and Frank Connor, 4226 Northeast 10th St., Portland, $8,290.

Pa., New Castle—City, bituminous materials street paving various streets throughout city, day labor under supervision of G. H. Throop, city engr. $348,000. City will purchase about $100,000 worth of materials and equipment. **Maturity at once.**

Pa., Scranton—City, bituminous repairs to various streets and highways throughout city, damaged by winter snow and ice, own forces under supervision of B. J. Harding, genl. supt. Dpt. P. Wks. Est. $40,500. City purchases materials. **Maturity Apr. 30.** C. F. Schroeder, City Hall, engr.

Pa., Williamsport — City, repairing 90 mi. brick, concrete, asphalt city streets, damaged by flood, day labor under supervision of G. W. German, dir. Hys. To exceed $23,000. L. Mussina, city engr.

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South Carolina—State Hy. Dpt., Columbia, earth type surfacing 3.188 mi. Route 901, W.P.S.S. 419-A, Chester Co., to Hendricks & Kennedy, Inc., Commercial Bank Bldg., Charlotte, N. C., $26,850***earth type surfacing 2.323 mi. Route 511, W.P.S.S. 413-A, Georgetown and Williamsburg Counties, to R. Lee, Inc., Summerville, $16,996***concrete paving 0.339 mi. Route 76, W.P.G.H. 45-B, Richland Co., to Carolina Contg. Co., Columbia, $33,900 ***bituminous surfacing 0.263 mi. Route 22, W.P.G.H. 319 and W.P.G.M. 319, Newberry Co., to Boyle Road & Bridge Co., Sumter, $23,545. Grand total $101,297. Bids Feb. 18, State Hy. Dpt., Columbia, rejected bids Feb. 18, improving hys. in Spartanburg, Dillon, Clarendon, Georgetown and Bamberg Counties, will readvertise. Noted Feb. 25, C. D.—Feb. 13, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, widening, grading, drainage structures 1.17 mi. State Hy. 66, W.P.H. 429-G, Jim Wells Co., to R. W. Briggs & Co., Pharr, $66,514 est. $70,000***4.884 mi. State Hy. "F," W.P.S.O. 901-A, Fayette Co., to J. C. Gilstrap, Tatum, $31,175 est. $30,000***7.48 mi. State Hy. "F," W.P.S.O. 892-A, Panola Co., to J. T. Leslie, Bailey, $41,567 est. $40,000***9.723 mi. State Hy. "F," W.P.S.O. 882-A, Runnels Co., to J. Floyd Malcom & Co., Abilene, $31,444 est. $35,000***concrete paving 6.771 mi. State Hy. 2, F.A.P. 14, reopened, Units 4 and 86-A, reopened, Unit 2, Wise and Montague Counties, to Standard Paving Co., 251 Majestic Bldg., Fort Worth, $156,885 est. $160,000. Grand total $327,536. Bids Mar. 11. New **P.W.A.** Noted Mar. 19, C. D.

★ **Texas**—G. Gilchrist, state hy. engr., Austin, widening, grading, drainage structures 4.73 mi. State Hy. 15, Kaufman Co., and resectioning shoulders and slopes and single asphalt surface treating 6.3 mi. State Hy. 1, Dallas Co., to Gifford-Hill & Co., Mercantile Bldg., Dallas, $98,728 and $47,888 respectively, est. $100,000 and $50,000 respectively***grading, drainage structures 14.52 mi. State Hy. "F," W.P.S.O. 896-A, Shelby Co., to J. S. Moore & Sons, Lufkin, $62,766 est. $70,000 ***10.747 mi. State Hy. 2, Johnson Co., to Womack-Henning Constr. Co., Abilene, $189,800 est. $200,000***6.108 mi. State Hy. "F," Tom Green Co., to E. F. Bucy & Sons and C. T. Childs, Rising Star, $32,852 est. $35,000 ***grading, drainage structures, select material surfacing 4.188 mi. State Hy. "F," Scurry Co., to Thomas & Ratliff, Rogers, $19,631 est. $20,000***widening, grading, drainage structures 5.112 mi. State Hy. 27, W.P.M.H. 842-A, Bexar Co., to Word & Worrell, Austin, $30,709 est. $35,000***grading, drainage structures with asphalt soil stabilization 4.68 mi. State Hy. "F," Hale Co., to T. M. Brown & Sons, Lubbock, $25,714 est. $25,000. Grand total $508,088. Bids Mar. 10. New **P.W.A.** Noted Mar. 16, C. D.

Utah—State Rd. Comn., Salt Lake City, grading, draining, gravel surfacing 3.455 mi. road between Heber and Hailstone, Wasatch Co., to Reynolds-Ely Constr. Co., Springville, $35,148 est. $44,000***gravel surfacing 2.726 mi. road between Hurricane and LaVerkin, Washington Co., to Northwestern Engr. Co., Rapid City, S. D., $12,979***concrete surfacing 0.389 mi. state highway at Magna, Salt Lake Co., to Mullins & Wheeler, 494 East First South St., Salt Lake City, $22,455 est. $22,635. Grand total $70,582. Noted Mar. 30, C. D.—Apr. 2, E. N.-R.

West Virginia—State Rd. Comn., Charleston, grading concrete paving Smithburg relocation, grade crossing WPGH 185-E, Doddridge Co., to Clarksburg Excavating Co., Clarksburg, $110,041 ***improving Flatwoods Fry Rd. WPSO 267, Kanawha Co., and Spencer Bright Rd. PWS 854-C, Roane Co., to Abbot Constr. Co., Charleston, $21,987 and $40,046 respectively***PWS 854 B, Roane Co., to Southern Oil & Tar Co., Huntington, $36,376***Davis Randolph Co. line PWS 867 Tucker Co., to Keely Constr. Co., Clarksburg, $34,494. Grand total $242,944. Bids Mar. 24. Received no bids Mar. 24 improving Bructon Penna State Line, PWS 189A Preston Co. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

★ **Wis., Milwaukee**—City, reconstructing and paving streets, relief labor. Est. $5,500,000. **W.P.A.** R. E. Stoelting, comr.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

Conn., Hartford—City, T. J. Foley, Works Progress Administrator, making plans Commerce St. dike, west bank of Connecticut River, $350,000. W.P.A. project. R. N. Clark, Municipal Bldg., engr.

★ †**Georgia**—U. S. Bd. Engineers, Col. E. I. Brown of Army Engineers, S. M. Woodward consultant Natl. Resources Committee and R. N. McWhorter, ch. engr., Federal Power Comn. submitted report and recommended to president, high flood control, and hydro electric power development on Savannah River, incl. constructing concrete gravity dam on Savannah River 21 mi. above Augusta, creating reservoir 52 sq.mi., power house, below dam. Est. $21,000,000.

★ **Ill., Chicago**—Sanitary Dist., 910 North Michigan Ave., plans constructing lock on

†*Federal Government.*

Earthwork, etc. (Continued)

Chicago River near its mouth for reducing flow of water from Lake Michigan. $3,000,000. W. H. Trenkaus, 910 North Michigan Ave., engr.

†Me., Eastport—U. S. Eng., Eastport, postponed indefinitely excavation for navigation lock at Treat Island, Passamaquoddy Bay Dam and Power Project, incl. 350,000 cu.yd. excav. Noted Feb. 24, C.D.—Feb. 27, E.N.-R.

La., New Orleans—Standard Oil Co., Baton Rouge, plans driving clusters piling along line of existing cluster in front of its wharf, replace piles in drift fender located on left bank of Miss. River, near Carrollton.

N. Y., Brooklyn—Dpt. Parks, Arsenal Bldg., Central Park, New York, drainage system for playground, Manhattan Ave., Berry and Nassau Sts. $32,000. A. Embury, 2nd, c/o owners, archt.

Oklahoma—See "Unclassified."

Pa., Altoona—See "Sewerage and Waste Disposal."

Pa., Carbondale—City, W. L. Monahan, mayor, making plans dredging Lackawanna River within confines of city. Possibly a P.W.A. project. W. L. Giles, city engr.

Alta., Edmonton—Municipality voted $25,000 for diversion of Rat Creek. Probably day labor. A. W. Haddon, engr.

Sask., Wiseton—Municipality, E. H. Young making plans new drainage system. $25,000.

BIDS ASKED

†South Carolina—Apr. 14, by U. S. Eng., Charleston, dredging 564,910 cu.yd. from intercoastal waterway between Winyah Bay, Georgetown Co. and Charleston, Charleston Co.

†Texas—Apr. 20, by U. S. Eng., Galveston, removing upper and lower lock gates at Lock and Dam 20, Trinity River.

Tex., Port Arthur—Apr. 14, at office Renfro & Keen, attys. for Beaumont Navigation Dist. (owner) Goodnue Bldg., Beaumont, constructing regulating dam, construction of a rein.-con. and steel dam in Taylor's Bayou, near here, 38 ft. high, 210 ft. long rein.-con. spillway. $80,000. Harrington & Cortelyou, 1005 Baltimore Ave., Kansas City, Mo., engrs. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

†Virginia—Apr. 7, by U. S. Coast Guard, Wash., D. C., dredging channel and basin, removing and depositing 60,000 cu.yd. dredge material for Smith Island C. H. Station, south end Smith Island near Townsend, Northampton Co.

Sask., Swift Current—Apr. 6, by L. B. Thomson, chn. Water Development Com., all necessary work in Val Marie Irrigation Dist. to erect in place all timber structures required for main canal and distributaries of the Dist. for Province of Saskatchewan, Regina. About 100,000 f.b.m. timber will be required.

CONTRACTS AWARDED

★ †Arizona and California—Bureau Reclamation, Yuma, Ariz., constructing schedules 1 and 4, earthwork and tunnels Gila Valley Project, to Boyce & Igo, Yuma, Ariz., $273,600***. Schedules 2 and 3, to Mittry Bros., 5531 Valley Rd., Los Angeles, Calif., $681,575. Bids Feb. 27. Noted Feb. 28, C. D.—Feb. 20, E. N.-R.

N. J., Bay Head—Commerce & Navigation, Trenton, dredging channel in section of Inland Waterways, Barnegat Bay, Bay Head-Manasquan Canal, to Hill Dredging Co., Ventnor, 5.75c. per yd. Bids Mar. 16. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

N. Y., Brooklyn—Marine Parkway Authority, Arsenal Bldg., Central Park, New York, placing hydraulic fill in Marine Park and Jacob Riss Park, to Atlantic, Gulf & Pacific Co., 13 Park Row, New York, $260,018. Bids Mar. 16. Noted Mar. 17, C. D.—Mar. 12, E. N.-R.

N. C., Greenville—Pitt Co., Drainage Dist. 3, 27 mi. drainage, 1,219,067 cu.yd. excav., channel average 27 ft. wide at top, 20 ft. wide at bottom, 7 ft. deep (project called Swift Creek Drainage Project), in central and southern part of Pitt Co., 1½ mi. north of Ayden, drag line, to J. M. Gregory, Raleigh, floating steel drag line, to M. P. Moore. Est. $154,000. W.P.A. Awarded Mar. 16.

Tex., San Juan—Hidalgo Co. Water Imprv. Dist. 2, c/o P. Neilson, pres., San Juan, laying concrete, rein.-con. irrigation pipe, reconstructing and lining irrigation canals and installing gates and constructing irrigation structures, involving 370,000 cu.yd. earthwork, 2,100,000 sq.ft. canal lining, 24 concrete bridges, 96,500 cu.yd. excav., 240 ft. 36 in. rein.-con., 360 ft. 30 in. and 80 ft. 24 in. concrete pipe, canal lining, to R. W. Briggs & Co., Pharr, $432,395; drainage and excavation, to J. E. Ballinger, San Benito, $12,779. Est. $450,000. P.W.A. Bids Dec. 28. Noted Jan. 16, C. D.—Dec. 26, E. N.-R.

†Washington—Bureau Reclamation, Yakima, constructing spillway for Kachess Dam, Yakima Project, to J. Klug, Nyssa, $48,770. Bids Feb. 24. Noted Mar. 2, C.D.—Feb. 6, E.N.-R.

UNCLASSIFIED

PROPOSED WORK

Ill., Chicago—AMUSEMENT PARK IMPROVEMENTS—White City, Inc., 63rd St. and South Park Ave., plans amusement park improvements, incl. theater, playhouse, swimming pool, stadium, new rides, air conditioning $200,000.

Ill., Normal—SWIMMING POOL—State, Dpt. P. Wks. & Buildings, Div. Architecture & Eng., Springfield, plans constructing swimming pool for Illinois Soldiers and Sailors Children's School. C. H. Hammond, Springfield, supervg. archt.

Ind., Rochester—AIRPORT—Rochester Air Port Development, H. V. Casper, clk., soon takes bids rough and fine grading and sodding for 92 acre airport $20,000; 4,000 lin.ft. drain tile $2,000; 26 dry wells $2,600; 6,500 sq.ft. brick packing space, 80x100 ft. hangar $10,800; 1,000 lin.ft. curbing, 2,464 sq.ft. cement walks and 10,000 lin.ft. cement floor and drives. Total est. $51,000. J. Osbourne, city engr.

Mass., Milford—SWAMP POND IMPROVEMENT, BATH HOUSE, etc.—Town, J. H. Cardella, chn. Bd. Selectmen, Town Hall, refused to accept federal grant of $170,000 by refusing to appropriate town's share of $45,000 at town meeting for improvement of Cedar Swamp Pond, bathing beaches, bath houses, etc.

Miss., Columbus — POWER SURVEY — City, appointed A. H. Beard Eng. Co., 44 South Central St., St. Louis, Mo., to make power survey of Columbus. Attempt will then be made to secure TVA power.

Montana and Saskatchewan—GAS PIPE LINE—Prairie Gas & Utilities Syndicate Ltd., G. C. Rooke, pres., Regina, Sask., bids late in April, constructing 187 mi. natural gas pipe line from Northern Montana gas fields to various sections Saskatchewan communities. To exceed $23,000. H. R. Davis, Liberty Bank Bldg., Buffalo, N. Y., engr. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

N. Y., Brooklyn—BATHING PAVILION—Dpt. Parks, Arsenal Bldg., Central Park, New York, plans by A. Embury, 2nd, constructing 1 story, 102x435 ft., brick bathing pavilion, 137 Bway. $375,000.

N. Y., Brooklyn—PLAYGROUND, etc.—Dpt. Parks, Arsenal Bldg., New York, plans by A. Embury, 2nd, c/o owner, constructing playground and wading pools, Neptune and Bay View Aves. To exceed $27,000.

N. Y., Jamaica—PARKS—Dpt. Parks, Arsenal Bldg., Central Park, plans by A. Embury, 2nd, c/o owner, park improvements, incl. wading pools, Jamaica Ave. and Highland Blvd. To exceed $27,000.

N. Y., Rochester—TRAINING TOWER—Bd. Supervs. Monroe Co., County Bldg., plans constructing structural steel firemen's training tower in East Henrietta Rd. $45,000. Maturity early in 1936.

N. Y., Scarsdale — SWIMMING POOL — Schmidts Farm, Scarsdale, soon takes bids 100x200 ft. swimming pool, with bathhouses, chlorination system to chemically treat water, west of here in Greenburgh Twp. To exceed $100,000. Private plans.

N. Y., White Plains — BUS TERMINAL — Westchester Co. Park Comn., 148 Martine Ave., plans constructing bus terminal. To exceed $50,000.

★ Oklahoma and Colorado — RAILROAD BRANCH LINE—Atchison, Topeka & Santa Fe R.R. Co., G. W. Harris, ch. engr., 80 East Jackson Blvd., Chicago, Ill., final surveys made for constructing 112 mi. branch line from Boise City, Okla., to Las Animas, Colo. $1,000,000.

Oklahoma — RAILROAD — Chicago, Rock Island & Pacific R.R. Co., W. H. Petersen, ch. engr., LaSalle St. Sta., Chicago, Ill., made preliminary plans bank widening 30 mi. from El Reno to Chickasha. $75,000.

Okla., Oklahoma City — UNDERGROUND DUCT—Oklahoma Gas & Electric Co., 321 North Harry St., made plans extending underground duct system for power transmission on Walker St. $30,000. Byllesby Eng. Co., 231 South LaSalle St., Chicago, Ill., engrs.

Okla., Woodward — PLAYGROUNDS, etc.—City voted bonds constructing public playground, bathhouse, stadium and fine arts building. $35,000. F. Vaugh, city engr.

★ Pennsylvania and New Jersey—TUNNEL—Delaware River Tunnel Corp., 1500 Walnut St., Phila., Pa., V. T. Ritter, designer and president, plans Delaware River Tunnel connecting Hog Island and Billingsport, 10 mi. south of Camden, N. J. $12,000,000-$15,000,000. Help is expected from R.F.C. and P.W.A. So far $2,000,000 private capital has been subscribed. Secretary of War Dern approved project. Expect to take bids within 60 days.

Texas—PIPE LINE—Gulf Co., 461 South Comal St., San Antonio, and Gulf Bldg., Houston (Gulf Pipe Line Co. Holding Co.), making surveys for 10-12 in. pipe line from Talco to Saltillo.

†Texas — AIR MARKINGS — Air Commerce Bureau, Wash., D. C., plans providing air markings along selected routes. $36,882. Maturity indefinite.

Tex., Kerrville — POWER LINES — Texas Power & Light Co., Kerrville, authorized to construct power lines radiating from its power unit here up the Guadalupe River for about 18 mi., supplying about 200 residences and recreation camps. Private plans.

Tex., Llano—POWER and LIGHTS—Llano Community Service, Inc., Llano, granted 50

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†Federal Government.

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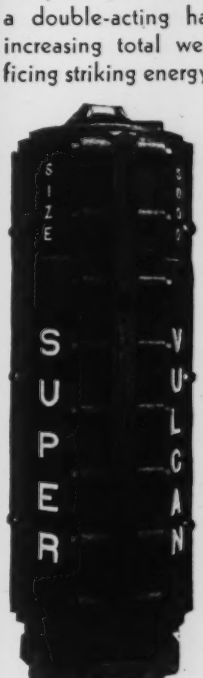

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FULL ¾ YD. CAPACITY
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- Fast operating speeds.
- Safety worm boom hoist.
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TYPES AND SIZES

Capacity	Model
⅜ yd.	20
⅜ yd. (Truck Shovel)	10
⅜ yd. (Tractor Shovel) ¾ Circle	
½ yd.	30
⅝ yd.	38
¾ yd.	45
⅞ yd.	52
1 yd.	62
1¼ yd.	65

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Unclassified (Continued)

year franchise for power and lights. The company is practically all community-owned.

Wis., South Milwaukee—FIRE ALARM SYSTEM—City received $13,300 grant from P.W.A. for fire alarm system. Est. $30,000.

Ont., London—BREAKERS, etc.—P. Utilities Comn., E. V. Buchanan, genl. mgr., plans new breakers in No. 8 sub-station, $6,500; overhead line transformers, $4,000; wires, street lights and transformers, $10,000; overhead wires and cables, $1,000.

Ont., London—ROUNDHOUSE—London Division of Canadian Pacific Ry., A. O. Wolfe, resident engr., plans constructing 4 stall addition to roundhouse, $15,000; and constructing interlocking signal system near Hickson, $15,000.

★ **Ont., Toronto**—STREET RAILWAY—Toronto Transportation Comn., 35 Yonge St., soon takes bids for rails and materials for street railway track replacement on College, Dundas, King, Bloor Sts. viaduct and Danforth Ave. $400,000.

Que., Amos—RAILROAD—Quebec Goldfields Transportation Co., H. B. Montizambert, engr., 1445 Bishop St., Montreal, making plans constructing 150 mi. railroad from Amos to Mont Laurier and from Mitchell to Maniwaki.

Sask., Regina — STADIUM — Saskatchewan University plans constructing stadium.

BIDS ASKED

Calif., Los Angeles—DISTRIBUTION LINES, etc.—See "Contracts Awarded."

Colorado — RAILWAY — See "Contracts Awarded."

Conn., New Britain—PARK IMPROVEMENTS—See "Contracts Awarded."

La., Jonesboro—GENERATING UNIT—Apr. 7, by Mayor and Bd. Aldermen, furnishing, installing one 500 hp. Diesel engine generating unit with switchboard, domestic service pump and miscellaneous equipment. G. S. Wyatt, town clk.

Me., Camden—PARK DEVELOPMENT, etc.—See "Contracts Awarded."

Mass., New Bedford—SEAPLANE LANDING FLOAT—See "Contracts Awarded."

Neb., Grand Island—AIRPORT HANGAR—See "Contracts Awarded."

N. Y., Avon—ATHLETIC FIELD—See "Contracts Awarded."

N. Y., Grove—GAME REFUGE—See "Contracts Awarded."

N. Y., Jamaica—LOCKER HOUSE, etc.—See "Contracts Awarded."

Tex., San Antonio—RESORT—See "Contracts Awarded."

Ont., Toronto—PARK—Apr. 7, by City Comr. of Buildings, constructing 1 story, 50x90 ft., brick, steel bandshell, south end of Grand Plaza, Exhibition Park, for Canadian Natl. Exhibition, Lumsden Bldg., $50,000.

Que., Bourgeois — DAMS — See "Contracts Awarded."

CONTRACTS AWARDED

★ **Calif., Los Angeles** — DISTRIBUTION LINES, etc. — Southern California Edison Co., Edison Bldg., budget for 1936 amounting to approximately $2,350,000 will be set up to provide only for distribution lines 80%, and for transmission, 20%. Item of transmission will include mostly work to be done on improvements and betterments to equipment at various substations. Work will be done by own forces. N. B. Hinson, Edison Bldg., ch. engr.

★ **Calif., Los Angeles**—WHARVES, etc.—A. Eldridge, genl. mgr. of City, constructing concrete wharf and steel frame transit shed at Berth 155. Spec. 950, involving concrete wharf deck, steel frame transit shed, 144 ft. long, 120 ft. wide, steel rolling doors, sprinkler systems, electric system, boat line piping under concrete and timber apron, etc., and constructing 22.5 ft. x 462 ft. creosoted timber apron wharf, fender system, framing timber wharf structures, furnishing and placing crane rails and fastenings, etc., P.W.A. Docket 1209, Spec. 949, for Harbor Dpt., City Hall, to Wm. P. Neil Co., 4671 East 49th St., Vernon, $347,000 and $41,000 respectively, est. $61,000 and to exceed $23,000 respectively•••constructing rock rip rap bank protection and rubble bulkhead seawall at Berth 155, Wilmington, Spec. 955, to Los Angeles Harbor Dpt., City Hall, $14,700. Grand total $402,700. Bids Feb. 10, awarded Mar. 19. Noted Feb. 26, C. D.—Feb. 6, E. N.-R.

Colorado—RAILWAY—Denver & Rio Grande Western R.R., A. O. Ridgway ch. engr., 732 17th St., Denver, laying rail replacements between Grand Junction and Pueblo, day labor and separate contracts, 10,000 tons steel rail, to Colorado Fuel & Iron Co., Pueblo.

Conn., New Britain—PARK IMPROVEMENTS, etc.—City, Dpt. P. Wks., City Hall, constructing running track, bleachers, baseball diamond, tennis courts and golf course work in Stanley Quarter Park, Willow Brook Park, Smalley Park and grading new land for Stanley Golf Course. Owner builds. W.P.A. labor. To exceed $25,000. Materials, $13,650. G. Molleur, city engr.

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Ill., Chicago — RAILROAD — See "Materials and Equipment."

Ill., Chicago—STREET LIGHTS, etc.—City Hall, installing, operating and maintaining gas and gasoline equipment for street lights and posts, to American Development Co., 1 South Michigan Ave., $161,169. Awarded Mar. 11.

Ill., Winnetka — SWIMMING POOL — New Trier Twp. High School Dist. W. L. Brown, bus. mgr., Winnetka, 60x75 ft., general contract, rein.-con. brick natatorium, H. A. Peters Co., $73,884•••plumbing to Northern Plumbing & Heating Co., $15,5••••heating, to W. A. Pope Co., $12,501••• electrical wiring, to McWilliams Electric Co., $12,501•••ventilating, to Harowetz Heating & Ventilating Co., $13,973. Grand total $128,4••• P.W.A. Bids Dec. 27. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

Me., Camden—PARK DEVELOPMENT, etc.—Town, R. W. Johnson, chn. Bd. Selectmen, Town Hall, park development, rebuilding old wharf, landscaping, etc., day labor. Maturity soon.

Massachusetts—SOIL TEST BORINGS—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, soil test borings for various hy. and bridge construction projects in Cambridge, Revere, Saugus, Danvers, Gloucester, Swampscott, Mansfield and Westport, to Chas. A. Leary Co., 44 School St., Boston.

Mass., New Bedford—SEAPLANE LANDING FLOAT—City, G. H. Nye, city engr., and U. S. of A. Dpt. of Commerce, Airway Div., H. J. Law, div. administrator, 424 Park sq. Bldg., Boston, seaplane landing float, day labor, $50,000. **W.P.A.** Materials to be purchased by City and K. P. Foster, Procurement Officer U. S. of A. Treas. Dpt., Park Sq. Bldg., Boston.

Neb., Grand Island—AIRPORT HANGAR—City, constructing airport hangar, relief labor, $25,000. **W.P.A.** K. H. Gedney, Hastings, archt. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

N. Y., Avon—ATHLETIC FIELD—Village, City Hall, constructing athletic field, incl. grading driveway, parking area, running track, football gridiron, baseball diamond and 4 tennis courts, relief labor. Est. $25,618. **W.P.A.**

†**N. Y., Fort Covington**—DOCK—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing new dock at inspection station, to Landson Constr. Corp., 33 West 42nd St., New York. Noted Jan. 14, C. D.

N. Y., Grove—GAME REFUGE—Bd. Supervs., Alleghany Co., Belmont, constructing game refuge on 625 acres in Keenan Tract, incl. reforestation, cutting trails, building dams for fish ponds, laying out picnic grounds, etc., by relief labor. To exceed $23,000. **W.P.A.** J. E. Williamson, Federal Bldg., Elmira, procurement officer, W.P.A., will purchase material.

N. Y., Jamaica—LOCKER HOUSE, etc.—Dpt. Parks, Arsenal Bldg., Central Park, New York, constructing 1 story, 23x83 ft., brick locker house, $35,000; 1 story, 22x50 ft., brick comfort station, $12,000, etc., at Hillside Park, relief labor. Est. about $47,000. **W.P.A.** A. Embury, 2nd, c/o owner, archt.

★ **N. Y., Long Beach**—BOARDWALK—City Council, constructing boardwalk, to Faircroft Eng. Co., 16 Court St., Brooklyn, $701,941. Bids Mar. 11. Noted Mar. 12, C. D.

N. C., Rocky Mount—STADIUM—City, furnishing, erecting structural steel on foundations prepared by city for municipal stadium, to Richmond Structural Steel Co., Richmond, Va., $17,950. Noted Feb. 27, C. D.

O., Cleveland—GRANDSTAND—E. Hungerford, c/o Osborn Eng. Co., engrs., 7016 Euclid Ave., constructing 1 story, 80x300 ft., steel grandstand, Lake Front, to A. M. Higley Co., 2036 East 22nd St. Est. $50,000. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

O., Cleveland—SWIMMING POOL—See "Public Buildings."

Tex., San Antonio—RESORT—City, C. K. Quin, mayor, deepening, cleaning, beautifying Elmendorf Lake to be used as a public resort, controlled by the city, W.P.A. labor, $55,000. I. Ewig, city engr. E. P. Arneson, dist. engr. and superv.

Wash., Pullman — STADIUM — Washington State College, constructing stadium, to Howard S. Wright & Co., 2210 Second Ave., Seattle, $96,070. Est. $110,000. Awarded Mar. 20. S. A. Smith, Pullman, archt. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

Que., Bourgeois—DAMS—Canadian International Papers Co. Ltd., Three Rivers, constructing 2 dams on Stuart Creek, day labor. Noted Apr. 29, C. D.—May 2, E. N.-R.

Sask., Eastend—DAM—Federal and Provincial Govts., L. B. Thomson, chn., Swift Current, constructing 1,600 ft. high earth dam, 5 ft. high, for Eastend Community Irrigation Dist., to Beattie Ramsay, Lumsden, $74,250.

MATERIALS AND EQUIPMENT

PROPOSED WORK

TRUCKS and SCRAPERS—**South Bend, Ind.**—Bd. Comrs. St. Joseph Co., Court House, G. Thompson, aud., soon takes bids trucks and

aterials, etc. (Continued)

scrapers for Highway Maintenance Dpt. $14,000.

STREET SWEEPER, etc.—**Anderson, Ind.**—City plans purchasing new street sweeper and street grader. $9,000.

CAST IRON WATER PIPE—**Portland, Me.**—City, J. E. Barlow, city mgr. Portland Water Dist., 16 Casco St., plans purchasing 8 in. c.i. water pipe.

MATERIALS and EQUIPMENT—**Braintree, Mass.**—Town, A. E. Roberts, chn. Bd. Selectmen, plans purchase of equipment and materials for Federal Works Projects. $35,000 appropriated at town meeting.

FIRE TRUCK, etc.—**East Douglas, Mass.**—Town, E. Schuster, chn. Bd. Selectmen, Town Hall, soon purchases 1 fire truck $2,000, and fire hose $250. Funds appropriated for same.

EQUIPMENT — **Framingham, Mass.** — Town, W. S. Walsh, town clk., plans purchasing equipment and materials for Federal Works Projects, $35,000 appropriated for same. S. Dyer, town engr.

HIGHWAY EQUIPMENT—**Leominster, Mass.**—City, H. W. Burdett, mayor, City Hall, plans purchasing hy. department equipment. $6,500.

GRADER—**Lexington, Mass.**—Town, C. E. Ferguson, chn. Bd. Selectmen, Town Hall, plans purchasing grader for Hy. Dpt. and tree sprayer for Park Dpt.

UNDERGROUND CABLE—**Lexington, Mass.**—Town, C. E. Ferguson, chn. Bd. Selectmen, Town Hall, will soon purchase underground cable. Est. $4,000. Will be installed by day labor.

TRACTOR—**Southbridge, Mass.**—Town, V. P. Tetreault, chn. Bd. Selectmen, Town Hall, plans purchasing tractor for Hy. Dpt., $2,000; truck for Sewer Dpt., $570.

COLD PATCH MIXER, etc.—**Wakefield, Mass.**—Town, A. L. Evans, chn. Bd. Selectmen, Town Hall, plans purchasing 1 cold patch mixer, 1 oil burner and fuel tank, 1 road hone, one 2 ton tractor, blade plows for trucks with hydraulic lifts.

SNOW REMOVAL EQUIPMENT—**Faribault, Minn.**—Rice Co., A. W. Luecke, aud., plans purchasing additional snow removal equipment. C. E. Stahl, co. engr.

STEEL TANKS—**St. Louis, Mo.**—Rose Sterneck, 1624 Delmar Blvd., granted permit to install one 550 gal. and one 1,000 gal. underground steel tanks for gasoline for use in automobile filling station, 1624 Delmar Blvd.

STEEL TANK—**St. Louis, Mo.**—Traxide Oil Co., 4309 Clayton Ave., applied for permit to install one 12,000 gal. underground steel tank for gasoline for use in filling station, 6732 Manchester Ave.

TANKS — **St. Louis, Mo.** — Regina Strauss 1431 Louisville Ave., applied for permit to install three 550 gal. underground steel tanks for gasoline for use in automobile service station, 1431 Louisville Ave.

UNDERGROUND STEEL TANK—**St. Louis, Mo.**—Herman Blase, 7932-34 North Bway., applied to Bd. P. Service, for permit to install one 550 gal. and two 1,000 gal. underground steel tanks for gasoline in automobile service station, 7932-34 North Bway.

GASOLINE TANKS, etc.—**Brooklyn, N. Y.**—Atlantic Pacific Service Stations, 1310 Bedford Ave., plans purchasing several 1,000 gal. underground gasoline tanks, pumps, etc., for service station, 2240 Bedford Ave. Work to be done by separate contracts. M. J. Cafiero, 391 Fulton St., archt.

STEEL TANK—**Buffalo, N. Y.**—Hambleton Terminal Corp., 46 Skillen St., plans purchasing steel tank for gasoline storage, 107 Niagara st. To exceed $1,000.

STORAGE TANK—**Buffalo, N. Y.**—Standard Oil Co. of New York, c/o H. G. Graven, plans purchasing 1,000 gal. steel gasoline storage tank, for new service station, Genesee and Johnson Sts. To exceed $1,000.

STORAGE TANK—**Buffalo, N. Y.**—Virginia Delaware Corp., c/o A. Watson, M. & T. Bldg., plans purchasing 1,000 gal. steel gasoline storage tank for service station, 455 Delaware Ave. and Virginia St. To exceed $1,000. Bley & Lyman, 505 Delaware Ave., engrs.

STEEL TANKS, etc.—**Clymer, N. Y.**—G. H. Tenpas, Clymer, plans installing steel storage tanks, electric pump and other equipment in gasoline service station, Main St. To exceed $1,000.

SEWER PIPE — **Elmira, N. Y.** — Delaware Lackawanna & Western R.R. Co., G. A. Phillips, ch. engr., Hoboken, N. J., plans purchasing quantity of 24 in. vitr. tile sewer pipe for sewer line to run across Elmira High School Athletic Field for draining new underpasses. To exceed $1,000.

TANKS — **Forest Hills, N. Y.** — Lehman & Rosenwald, Woodhaven Blvd. and Yellowstone Ave., plans purchasing several 1,000 gal. underground gasoline tanks, pumps, etc., for 1 story, 40x117 ft., brick gasoline station, Woodhaven Blvd. and Yellowstone Ave. J. Z. Cohen, c/o owner, archt.

STORAGE TANK—**Rensselaer, N. Y.**—Tidewater Oil Co., 11 North Pearl St., Albany, plans purchasing steel gasoline storage tank for proposed gasoline station, Columbia and Washington Sts. To exceed $1,000. E. C. Smith, 13 Glendale Ave., Elmsmere, engr.

DISTILLING EQUIPMENT—**Rochester, N. Y.**—Rochester Distilling Co., P. G. Napadona, genl. mgr., bids in April or May, complete distilling equipment for distilling alcohol in liquors and alcohol. Have purchased old Vacuum Oil plant.

STEEL STORAGE TANK—**Tonawanda, N. Y.**—C. E. Blythe, c/o Tidewater Oil Co. (owner), 22 Maurice St., Buffalo, plans purchasing 1,000 gal. steel storage tank. To exceed $1,000.

FIRE TRUCK—**Hartville, O.**—Hartville Volunteer Fire Dpt., Inc., plans purchasing fire pumper truck to be equipped with 2 booster tanks and 500 gal. pump. To exceed $1,000.

SNOW REMOVAL MACHINERY, etc.—**Bradford, Pa.**—City, City Hall, plans purchasing snow removal machinery and equipment. $4,000 or more. J. H. Quirk, City Hall engr.

LOADING MACHINE—**Oil City, Pa.**—City plans purchasing automatic snow loading machine. $3,500. W. W. Webber, City Hall, engr.

TRUCK—**Oil City, Pa.**—Pennzoil Co., Drake Bldg., plans purchasing new 5 ton truck equipped with 1,500 gal. steel tank and pump, $3,500. A. W. Clinger, purch. agt.

†SEWER PIPE, etc.—**San Antonio, Tex.**—Works Progress Administration, San Antonio, soon takes bids supplying 800 lin.ft. 12 in. clay sewer pipe; 38,000 lin.ft. various sized lumber; 200 bbl. Portland cement; 8,000 lb. reinforcing steel; 32,000 lin.ft. lumber; standard water gate valves; 6,800 lin.ft. salt glazed vitr. sewer pipe; large quantity dynamite caps; 1,000 bbl. Portland cement; 100 tons oil asphalt; windows, doors, transom sash, sash, casing, sash weights, nails; 18,000 lin.ft. lumber; 1 lot structural steel; 500 bbl. cement; hardware, large amount nails; 200 tons oil asphalt; 68,000 lin.ft. lumber; water pipe; barbed wire; barbed wire spools; spades, shovels, axes, scoops, mattocks, pucks, handles, saws, files, post hole diggers, trowels, wrenches, cotton trot lines, levels, barrels, buckets, rope, wagon covers, water kegs, padlocks, office furniture.

ROAD MACHINERY—**Atwood, Ont.**—Municipality and Elma Twp., John J. Ballantyne, supt., R.R. 4, wants prices on various types of road machinery.

ROAD MAINTAINER—**Otterville, Ont.**—Twp. of Norwich South, C. W. Ottewell, clk., desires prices power road maintainer.

ORES—**Montreal, Que.**—I. Saxe, 980 Saint Antoine St., on behalf of British interests, wishes to purchase ores, concentrates or by-products containing copper, lead, zinc, nickel, cobalt or molybdenum. Send full particulars regarding quantity and assays.

BIDS ASKED

†STEEL CYLINDRICAL PONTOONS—**Sacramento, Calif.**—U. S. Eng., Post Office Bldg., Sacramento, taking bids furnishing 40 steel cylindrical pontoons, completely assembled and finished, each to consist of 2 steel cylinders with manholes and eyepads, Douglas fir spreaders and platforms, structural steel pontoons, saddles and c.i. steel and upper and lower bearing plates. (Date not set.)

GRADER—**Stockton, Calif.**—B. L. Trahern, city clk., taking bids furnishing 1 motor grader.

TRUCK, etc.—**Vallejo, Calif.**—City Street Dpt. taking bids ½ ton pick-up truck, gasoline driven portable air compressor, 15 ton gasoline road roller. T. D. Kilkenny, city engr.

†WELDED PLATE STEEL OUTLET PIPES—**Denver, Colo.**—Apr. 13, by Bureau Reclamation, Denver, Colo., furnishing two 42 in. diam. welded plate steel outlet pipes for installing in outlet works of Moon Lake Dam, Moon Lake Project, Utah; also 2 welded plate steel outlet pipes for outlet works Taylor Park Dam, Uncompahgre Project, Colo.

†REINFORCEMENT BARS, etc. — **Wash., D. C.**—Apr. 13, by General Purchasing Officer, Wash., D. C., reinforcement bars, ring bolts, copper wire and cable, spray guns, industrial truck, etc., Schedule 3135.

TRUCK CHASSIS, etc.—**Florida**—Apr. 14, by State Road Dpt., Tallahassee, furnishing truck chassis, dump trucks, hydraulic hoists, nine 2-door sedans.

TRANSFORMERS—**Chicago, Ill.**—Apr. 7, by City, City Hall, furnishing, delivering four 250 kva. single phase transformers. O. E. Hewitt, ch. engr.

CRUSHED STONE—**Corydon, Ind.**—Apr. 7, by Harrison Co., Court House, 3,500 cu.yd. crushed stone for County Highway Maintenance Dpt. C. Wolf, c/o owner, engr.

TRUCKS—**Rensselaer, Ind.**—Apr. 13, by Bd. Comrs. Jasper Co., Court House, three 1½ ton trucks. F. M. Hart, Jr., aud.

PUMP—**Owensboro, Ky.**—Apr. 8, at office of C. T. Smith, city clk., City Hall, horizontal centrifugal high service pump for municipal waterworks plant. J. L. Foor, comr. P. Property, Westcott & Thornton, Cary Bldg., consult. engrs.

BITUMINOUS PATCHING MATERIAL, etc.—**Boston, Mass.**—Apr. 6, by City, Supply Dpt., D. G. Doherty, supt., City Hall Annex, furnishing asphaltic cement and road asphalt as required; Apr. 7, 45% asphaltic road oil as required.

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†*Federal Government.*

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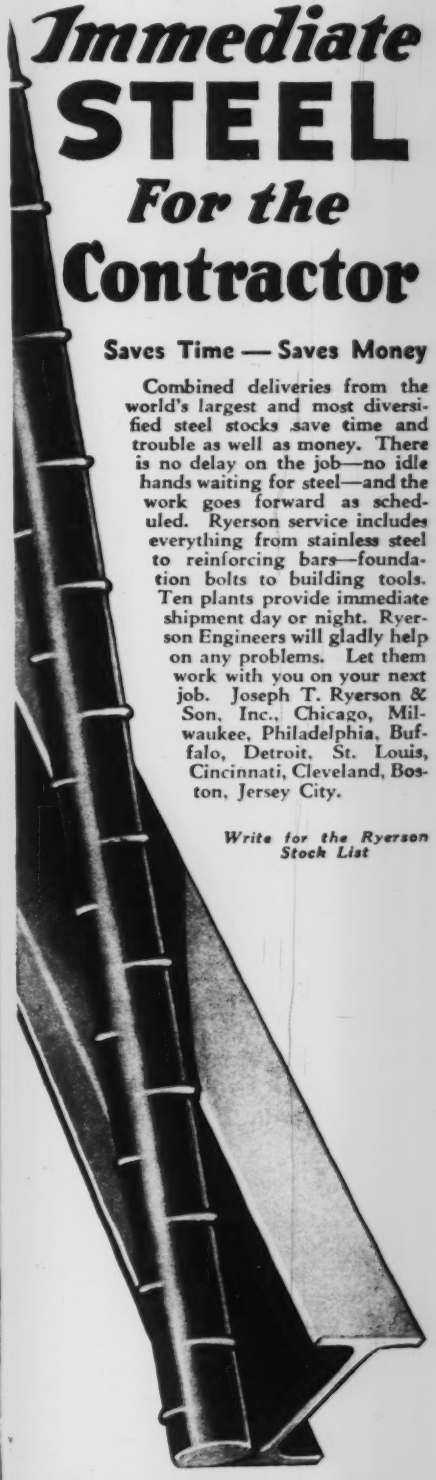
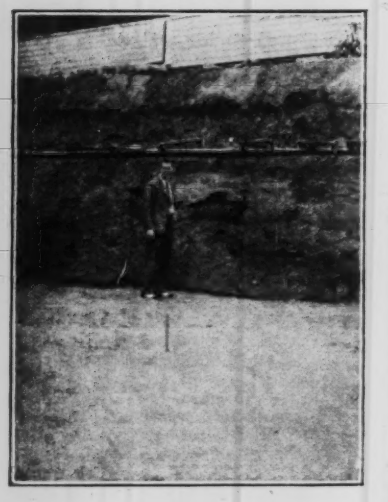


RYERSON STEEL-SERVICE



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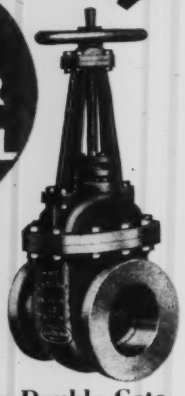

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Materials, etc. (Continued)

ASPHALT BASE MIXTURES, etc.—**Marblehead, Mass.**—Apr. 8, by Town, M. L. Bell, chn. Bd. Selectmen, Town Hall, furnishing sidewalk construction materials, incl. asphalt base and top mixtures, Portland cement, broken stone, sand and gravel.

CULVERTS—**Ortonville, Minn.**—Apr. 7, by O. E. Hahn, aud. Big Stone Co., metal and concrete culverts for 1936 season.

†LUMBER—**Vicksburg, Miss.**—Apr. 21, by U. S. Eng., 20,000 ft. B.M. 1x12 in. lumber in 14, 16, 18 and 20 ft. lengths, f.o.b. Vicksburg.

†PIPE, etc.—**Vicksburg, Miss.**—Apr. 10, by U. S. Eng., pipe fittings and water pipe valves.

†STEEL ANGLES, etc.—**Vicksburg, Miss.**—Apr. 24, by U. S. Eng., 4,980 lb. Class A structural steel angles, 16,588 lb. structural steel bars, 8,182 lb. structural steel square bars, etc., f.o.b. Vicksburg.

†WHITE LEAD PASTE, etc. — **Vicksburg, Miss.**—Apr. 23, by U. S. Eng., 5,000 lb. basic carbonate white lead paste; 20,000 lb. dry red lead; 200 gal. turpentine; 200 gal. linseed oil, raw; 200 gal. boiled linseed oil, f.o.b. Vicksburg.

†WIRE ROPE—**Vicksburg, Miss.**—Apr. 27, by U. S. Eng., furnishing wire rope, f.o.b. Vicksburg.

STONE, etc.—**Clayton, Mo.**—Apr. 8, by St. Louis Co., Court House, furnishing stone and gravel for use on county roads, to be ordered as required during the year ending Apr. 1, 1937. J. M. Crutsinger, Clayton, co. engr.

LABORATORY EQUIPMENT—**St. Louis, Mo.**—Apr. 21, by Bd. P. Service, City Hall, installing laboratory equipment in various buildings at Homer G. Phillips City Hospital for Colored. $30,000. P.W.A. project. W. C. E. Becker, city engr.

†WOOD PILES, etc.—**Omaha, Neb.**—Apr. 7, by U. S. Eng., City Natl. Bank Bldg., furnishing 5,000 round wood piles 24-68 ft. long for maintenance and improving Missouri River. $25,000.

†CABLE—**Brooklyn, N. Y.**—Apr. 6, by Signal Corps, Procurement Div., Army Base, 58th St. and 1st Ave., 8,000 ft. cable.

ARSENATE of LEAD—**Buffalo, N. Y.**—Apr. 7, by City, City Hall, J. T. Downing, dir. Purchase, powdered arsenate of lead for tree spraying in city parks. To exceed $1,000.

STONE, SLAG, etc.—**Buffalo, N. Y.**—Apr. 7, by Bd. Supervs. Erie Co., 263 Terrace St., stone, slag, sand, gravel, limestone, filler, calcium chloride for 1936. To exceed $1,000.

PORTLAND CEMENT, etc.—**Falconer, N. Y.**—Apr. 8, by S. E. Fitch, engr., Chautauqua, Co., 454 North Work St., furnishing 3,000 bbl. Portland cement; 100 tons flake calcium chloride; 50 gal. white paint in 5 gal. lots; 1,800 gal. Penn. grade motor oil; crushed stone; crushed slag; crushed gravel; coarse aggregate; fine aggregate; rubber tires; picks, shovels, small hardware, spark plugs, lanterns, etc. To exceed $1,000.

CHAIN HOIST — **Fredonia, N. Y.** — W. R. Morse in market for 1-ton spur gear chain hoist.

PIPE—**Westfield, N. Y.**—S. R. Ross, engr., Graystone Lodge, taking bids furnishing 1,800-1,900 ft. 6¼ in. pipe and connections for Ross Associates, c/o J. Hernandez, Halesite. To exceed $1,000.

CULVERTS, etc.—**Grafton, N. D.**—Apr. 9, by W. J. LaMarre, aud. Walsh Co., portable culverts for 1936 season 9- to 72-in. in carload and less than carload lots; also 300 or more pcs. 4x12x18 ft. No. 1 rough fir, full size bridge plank in car lots.

ELEVATING GRADER—**Valley City, N. D.**—Apr. 11, by J. N. Baillie, aud. Barnes Co., furnishing 1 elevating grader, 48 in. carrier and 1 crawler type tractor of 75 or more hp.

CEMENT, etc.—**North York, Pa.**—Apr. 8, by Boro Council, furnishing 50 tons cement, 94 cu.yd. mixed concrete, 50 tons Arundle sand, 50 tons stone ballast, 1,600 tons stone chips, 410 tons stone screenings, 7,000 gal. hot liquid tar or asphalt. To exceed $1,000.

DUMP TRUCK—**Plains, Pa.**—Apr. 6, by Bd. Comrs. Plains Twp., J. Porzatko, secy., 161 East Carey St., furnishing 1½ ton dump truck, 1 motorcycle with sidecar. To exceed $1,000.

REINFORCING STEEL, etc.—**Virginia**—Apr. 8, by State Hy. Dpt., Richmond, 4133 lb. reinforcing steel, 500 pcs. ⅝ in. round steel rods, shipped to Bentonville, Warren Co.

GRADER—**Appleton, Wis.**—Apr. 8, by City, furnishing 12,000 lb. motor grader, power controls, enclosed cab, scarifier. L. R. Schindler, Appleton, engr.

SEWAGE DISPOSAL PLANT EQUIPMENT—**Kaukauna, Wis.**—Apr. 9, by City Utilities Comn., furnishing equipment for sewage disposal plant. P.W.A. project. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ill., engrs.

ROAD OIL—**Neenah, Wis.**—Apr. 9, by City, furnishing 40,000 to 50,000 gal. asphalt road oil. A. G. Prunuske, engr.

CHLORINATOR—**Chatham, Ont.**—Municipality, Water Comrs. in market for automatic chlorinator. T. Kingston, engr.

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CRUSHED STONE—**Chippawa, Ont.**—W. S. Marshall taking bids supplying crushed stone for 1936, price per ton delivered by truck wanted.

SHOVEL—**Hamilton, Ont.**—L. R. Gilmour, 68 George St., in market for gasoline, steam or Diesel shovel ¾ yd. dipper, also boom and crane (used considered).

WATER PUMP — **St. Mary's, Ont.** — Public Utilities Comn., W. McKee, secy., in market for small duplex water pump. $600 available.

SERVICE BOXES—**Toronto, Ont.**—York Township taking bids water service materials, consisting of service boxes, corporation fittings for copper and lead services, copper service pipe, lead service pipe, iron pipe and fittings also miscellaneous fittings. Specifications at office of O. M. Falls, cor., 40 Jarvis St.

TRANSFORMERS—**Woodstock, Ont.**—P. Utilities Comn., R. L. Murray, chn., in market for 2 transformers. $5,000 available.

CHLORINATOR—**St. Johns, Que.**—Municipality in market for chlorinator. $1,200 available. O. Bessette, Jacques Carter St., engr.

†STEEL CASTINGS, etc.—**Alaska**—Apr. 30 by Alaska Road Comn., Seattle, Wash., steel castings, forgings, belts, pins and structural steel for highway bridge.

CONTRACTS AWARDED

VALVES and SPRINKLER HEADS—**Alameda, Calif.**—S. G. Blood, city clk., furnishing underground valves and sprinkler heads for Alameda Municipal golf course, to Hannah Irrigation Co., Irvington, $2,449. Bids Mar. 3, awarded Mar. 18.

ASPHALT FINISHING MACHINE—**Los Angeles, Calif.**—A. J. Holm, city purch. agt., City Hall, furnishing 1 gas electric asphalt finishing machine, quickly adjustable from 9 to 10 ft. complete, with 4 cylinder gasoline engine, 1,000 ft. 1½ in. steel asphalt forms change of width parts and dolly, Spec. 3473, to Brown Bros. Equipment Co., 4900 Santa Fe Ave., Vernon, $7,728. Bids Mar. 9, awarded Mar. 19. Noted Mar. 18, C. D.

†CONCRETE VIBRATORS, etc.—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 4 concrete vibrators, to Viber Co., 206 South Spring St., $1,580***6 jack hammers, blow-tube type, to Chicago Pneumatic Tool Co., 655 Santa Fe Ave., $1,140***copper strips, to Emil Brown Co., 300 East 9th St., $1,464. Grand total $4,184. Bids Mar. 5. Noted Mar. 13, C. D.

I-BEAM TUNNEL SETS—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Broadway, furnishing tunnel sets, 500 sets 12¼ lb. I-beam, and 250 sets 6x6 in. 20 lb. H-beam, Spec. 1903, to Commercial Shearing & Stamping Co., 5717 Santa Fe Ave., Vernon, $7,602. Bids Mar. 16, awarded Mar. 17. Noted Mar. 11, E. N.-R.

†METAL PIPE—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., furnishing corrugated metal pipe and drainage gates, to Western Pipe & Steel Co., 5717 Santa Fe Ave., $1,615. Bids Mar. 20. Noted Mar. 26 C. D.

MINE CARS—**Los Angeles, Calif.**—S. A. Joseph, purch. agt., Metropolitan Water Dist., 306 West 3rd St., furnishing 24 mine cars, Spec. E-242, Bid 54,851, to Madsen Iron Wks., 5631 Bickett St., Huntington Park, $4,920. Bids Mar. 9, awarded March 20. Noted Mar. 3, C. D.

TRUCK—**Los Angeles, Calif.**—H. E. Russell, purch. agt. Los Angeles Co., 524 North Spring St., one 600 gal. fire tank truck, Spec. 720, to Crown Body Corp., 2500 McPherson St., $6,850. Bids Feb. 3. Noted Jan. 29, C. D.

DEEP WELL PUMP—**Newport Beach, Calif.**—City Clerk, furnishing one deep well pump, capacity 1,200 g.p.m. against 60 ft. head, to have direct connected 30 hp. electric motor, to Byron-Jackson Co., 2150 East Slauson Ave., Huntington Park, $897. Bids Mar. 16, awarded Mar. 17. Noted Mar. 11, C. D.

CABLE—**Oakland, Calif.**—City Council, furnishing 13,373 ft. No. 6 AWG and 1,500 No. 10 AWG saturated paper-insulated lead-covered cable, to Westinghouse Electric Co., 1 Montgomery St., San Francisco, $2,107 and $216 respectively.

FIRE HYDRANTS—**San Francisco, Calif.**—T. A. Brooks, city purch. agt., City Hall, furnishing 200 low pressure fire hydrants and parts, Bid 1515, for City and San Francisco Co., to M. Greenberg Sons Co., 765 Folsom St., $84.85 each. Bids Feb. 17. Noted Feb. 21, E. N.-R.

STEEL RAILS—**Colorado**—See "Unclassified."

†VALVES—**Denver, Colo.**—Bureau Reclamation, Denver, four 36 in. valves for Agency Dam, Vale Project, Ore. and Moon Lake Dam, Moon Lake Project, Utah, to Joshua Hendy Iron Wks., 206 Sansome St., San Francisco, Calif., $16,734***six valves, for Taylor Park Dam, Uncompahgre Project, Colo., two 60 in. diam. for use at Seminoe Dam, Casper-Alcova Project, Wyo., and two 84 in. diam. at Alcova Dam, same project, to Hardie Tynes Mfg. Co., 800 North 28th St., Birmingham, Ala., $66,447. Bids Feb. 6. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

†INGOT COPPER—**Wash., D. C.**—Yards & Docks, Navy Dpt., Wash., D. C., 300,000 lb.

†Federal Government

Materials, etc. (Continued)

ingot copper, to Calumet & Hecla Consolidated Mining Co., 25 Bway., New York, 9.425c. per lb.

FLUXED ASPHALTIC LIMESTONE, etc.—**Chicago, Ill.**—Cook Co., furnishing, delivering 2,000 tons fluxed asphaltic limestone, rock asphalt cold application, to Southern Asphalt Products Co., 120 South LaSalle St., at $12.95 per ton, total $25,900•••2,000 tons crown rock, proprietary, cold lay, to Crown Rock Sales Co., 30 North LaSalle St., $10.60 per ton, total $21,200•••2,000 tons precote proprietary, cold lay, to Leininger Constr. Co., 30 North LaSalle St., $10.30 per ton, total $20,600. Bids Mar. 23.

GATE VALVES — **Chicago, Ill.** — City, City Hall, nine hundred 6- to 16-in. gate valves, to Manistee Iron Wks., 53 West Jackson Blvd., $27,305. Bids Feb. 17, awarded Mar. 25. Noted Feb. 21, C. D.

MANHOLE COVERS, etc.—**Chicago, Ill.**—City, City Hall, furnishing, delivering 185 manhole covers and 120 frames, to Hansel & Elcock Co., 3158 South California Ave., $1,622. Bids Mar. 16, awarded Mar. 25.

OFFSET BENDS—**Chicago, Ill.**—City, City Hall, furnishing, delivering 115 tons cast iron offset bends for 6- to 12-in. water pipe, to Hansell Elcock, 3153 South California Ave., $8,740; 1,275 malleable iron cross arms and 750 mounting clamps, to Chicago Malleable Castings Co., 1225 West 120th St., $1,821. Bids Mar. 16. Noted Mar. 23, C. D.

STEEL RAILS—**Chicago, Ill.**—Chicago, Milwaukee, St. Paul & Pacific R.R. Co., W. H. Penfield, ch. engr., Union Station, 21,000 tons steel rail, to Carnegie Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.; 7,000 tons, to Inland Steel Co., 38 South Dearborn St. Owner will place rail in Minnesota, Montana, South Dakota and Washington, by day labor.

DUMP BODIES, etc.—**Ames, Ia.**—State Hy. Comm., Ames, 52 dump bodies, to Barton Warner Co., 414 Chambers St., Sioux City, $9,067 •••season's supply pneumatic tires, to R. D. Newton Co., Des Moines, $20,835•••season's supply solid tires, to Goodrich Tire & Rubber Co., Des Moines, $9,335•••36 carloads bridge lumber, to Schoeneman Lumber Co., 60 West 7th St., Sioux City, about $29,000•••200,000 gal. bituminous material, to Socony Vacuum Oil Co., Kansas City, Mo., about $9,800••• 100,000 gal. bituminous material, to Standard Oil Co., Equitable Bldg., Des Moines, $7,200. Grand total $85,237. Bids Mar. 17. Noted Mar. 10, C. D.

BRIDGE LUMBER, etc.—**Atlantic, Ia.**—Cass Co., J. M. Ward, aud., 125,333 ft. BM Douglas fir bridge lumber; 26,400 ft. BM creosoted yellow pine lumber; and 5,640 ft. creosoted yellow piling, to Wheeler Lumber Bridge & Supply Co., 606 Hubell Bldg., Des Moines, $10,069•••miscellaneous paint, to John Lucas Co., 1362 West 37th St., Chicago, Ill., $122•••miscellaneous hardware, to Fullerton Lumber Co., Griswold, Ia., $268. Grand total $10,459. Bids Mar. 16. Noted Mar. 13, C. D.

BRIDGE LUMBER, etc.—**Creston, Ia.**—Union Co., 104,700 ft. BM fir lumber, 34,884 ft. BM creosoted yellow pine lumber, 3,830 lin.ft. creosoted yellow pine piling, to Nebraska Bridge Lumber & Supply Co., 730 Union State Bank Bldg., Omaha, $9,263; 940 lin.ft. corrugated metal culvert pipe, to Iowa Culvert & Pipe Co., 444 Insurance Exchange Bldg., Des Moines, Ia., $1,998. Bids Mar. 25, awarded Mar. 25. Noted Mar. 11, C. D.—Mar. 10, E. N.-R.

METAL CULVERT—**Nevada, Ia.**—Story Co., B. Dickey, aud., 2,500 lin.ft. 12- to 24-in. corrugated metal pipe culvert, to Haight Tractor & Equipment Co., 1314 Walnut St., Des Moines, $2,497; 1,000 lin.ft. 18 in. rein.-con. pipe, to Iowa Concrete Products Co., Ames, $1,050. Awarded Mar. 25.

★ †DREDGE—**Louisville, Ky.**—U. S. Eng., Louisville, constructing dredge, to Dravo Contg. Co., Neville Island Station, Pittsburgh, Pa., $578,450

CAST IRON PIPE, etc.—**Fall River, Mass.**—Municipality, furnishing 175 tons c.i. pipe, to U. S. Pipe & Fdry. Co., Burlington, N. J., about $7,500. Bids Feb. 18. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

TRUCKS—**Buffalo, Minn.**—Wright Co., E. R. Anderson, aud., one to seven 1½ ton trucks, to Gould Bros. Chevrolet Co., Monticello, $4,880. Bids Mar. 11. Noted Feb. 27, C. D.—Mar. 5, E. N.-R.

†MACHINE BOLTS, etc.—**Duluth, Minn.**—U. S. Eng., Canal Park, Duluth, machine bolts and nuts, also round spikes and wire nails, to Bethlehem Steel Co., 701 3rd St., Bethlehem, Pa., $792 and $55 respectively•••tie roads and turnbuckles, to A. J. O'Leary & Son Co., 5757 West 65th St., Chicago, Ill., $1,190 and $80 respectively•••washers, to E. B. Lanman Co., East Chicago, Ind., $129. Grand total $2,226. Bids Mar. 17. Noted Mar. 5, C. D.—Mar. 12, E. N.-R.

TRUCK—**Fergus Falls, Minn.**—Otter Tail Co., 1 motor patrol grader with snow-plow equipment, to W. H. Ziegler Co., 2331 University Ave., Minneapolis, $5,118, incl. extras. Bids Mar. 12. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

TRUCKS—**Red Wing, Minn.**—Goodhue Co., C. T. Taylor, aud., furnishing 3 power graders, to Austin-Western Road Mchy. Co., 2328 Territorial Rd., St. Paul, $5,070 each. Bids Mar. 3. Noted Feb. 27, C. D.

GRADER—**Rochester, Minn.**—Olmsted Co., A. L. Glabe, aud., 1 motor patrol grader, to T. W. Rosholt Co., 3138 Snelling Ave., Minneapolis, $3,259. Bids Mar. 12. Noted Mar. 5, C. D.

†BOAT SPIKES — **Kansas City, Mo.** — U. S. Eng., 45,000 lb. boat spikes and staples, to Sheffield Steel Co., Sheffield St., $1,633. Est. $1,400. Bids Mar. 20. Noted Mar. 17, C. D.

ROAD OIL, etc. — **St. Louis, Mo.** — Bd. P. Service, City Hall, 400,000 gal. more or less road oil to be delivered as required during year ending Mar. 31, 1937, to Shell Petroleum Corp., 1221 Locust St., Specs. A or B, at 4.17c. per gal.•••15,000 tons more or less asphaltic cement for same period, to Standard Oil Co. of Indiana, 314 North Jefferson Ave., 40-50 pen. $15.29 per ton and 85-100 pen. $14.79 per ton, both tank car lots•••asphaltic cement in tank wagon and distributor, to Rock Hill Asphalt & Constr. Co., LaDue Rd., 85-100 pen. or 150-200 pen. at 10.7c. per gal.•••500 ft. 3 coil A.W.G. section strand for use of Fire Department, to General Electric Co., 1301 Pierce Bldg., $528•••one 1,250 watt homelite generator and 1 blower, 3 spot lights, 3 flood lights, 4 vapor lights and 750 ft. 12-2 conduit superservice cord for City Lighting Department, to Barrett Electrical Supply Co., 3111 Washington Ave., $753•••1,500 G.E. sockets for City Lighting Department, to United Electric Supply Co., 1120 Pine St., $597•••2,000 ft. No. 6 A.W.G. service cable, to General Cable Corp., 1319 Ambassador Bldg., $438•••50 rolls 6x6x8x8 mesh reinforing wire for Street Department, to Bethlehem Steel Co., 1010 Pine St., St. Louis, $615. Bids Feb. 3, 4 and 28. Noted Feb. 24, C. D.

POWER TURBINE—**Omaha, Neb.**—Nebraska Power Co., Omaha, 15,000 hp. turbine, to General Electric Co., 230 South Clark St., Chicago, Ill., $288,800.

ROAD MATERIALS—**Mount Holly, N. J.**—Mt. Holly Twp. Comn., to Bituminous Service Co., New Brunswick, cold patch 15c. per gal.; Grade "B" tar 11.9c. per gal.; slow curing oil 6.75c.•••to Tar Asphalt Service, Inc., Silver Lake Ave., New Brunswick, cold patch 17c.; Grade "B" tar 12.5c.; slow curing oil 7.8c.••• to Atlantic Refining Co., 260 South Broad St., Phila., Pa., slow curing oil 8.27c.•••to Kingston Trap Rock Co., Kingston, ¾ in. stone $1.68 a ton•••to Lambertville Trap Rock Co., River Rd., Lambertville, ¾ in. stone $1.72 a ton.

GASOLINE TANKS, etc.—**Brooklyn, N. Y.**—See "Proposed Work."

PIPE—**Buffalo, N. Y.**—City, 135 tons c.i. pipe, to U. S. Pipe & Fdry. Co., Burlington, N. J. Est. exceeds $5,000. **W.P.A.** Laying watermains by relief labor.

†REINFORCING STEEL—**New York, N. Y.** —Procurement Div., Treas. Dpt. at office Sup. Archt., Wash., D. C., 690 tons reinforcing steel for W.P.A. projects, to W. Ames & Co., 417 Communipaw Ave., Jersey City, N. J.

ROAD EQUIPMENT—**Raleigh, N. C.**—Div. Purchase & Contr., Raleigh, furnishing four ¾ cu.yd. clam shell excavators, to Carolina Tractor & Equipment Co., 733 West Hargett St., at $5,461.50 each•••six 105 cu.ft. air compressors, to Raleigh Tractor & Equipment Co., 419 South Wilmington St., at $1,995 each••• five 315 cu.ft. air compressors, to E. F. Craven, Greensboro, $4,275 each•••one ¾ cu.yd. gas shovel, to N. C. Equipment Co., 3116 Hillsboro St., at $6,395. Bids Mar. 13, awarded Mar. 17. Division Purchase & Contr., A. S. Brower, dir., 1 retread paver, to E. F. Craven, Greensboro, $2,456. Bids Feb. 14, awarded Mar. 17. Noted Mar. 9, C. D.

STREET SURFACING MATERIAL — **Waco, Tex.** — Bd. City Comrs., supplying hot plant asphalt mix for street surfacing, f.o.b. city plant, to H. L. Markland, Waco, $62,000. Bids Mar. 6. Noted Mar. 3, C. D.

PIPE, etc.—**Centralia, Wash.**—City, 4,194 ft. 6 in. and 1,008 ft. 4 in. c.i. pipe, 800 ft. 2 in., 2,225 ft. 1½ in., 7,875 ft. 1 in. and 700 ft. 3 in. galvanized steel pipe, to H. G. Purcell, Colman Bldg., Seattle, $4,947; valves, to Rensalaer Valve Co., Arctic Bldg., Seattle, $189.

PIPE—**Appleton, Wis.**—City, 630 ft. 18 in. and 175 ft. 15 in. rein.-con. pipe, to Koeppe Bros., Inc., Appleton, $788 and $201 respectively; 565 ft. 12 in. vitr. clay pipe, to J. Haug & Son, Appleton, $198. Grand total $1,187. Noted Mar. 6, C. D.

†PORTLAND CEMENT — **Madison, Wis.** — Treas. Dpt., Procurement Div., 300 bbl. Portland cement, f.o.b. cars State Fair Park, Milwaukee, to Tews Lime & Cement Co., 1136 East North Ave., Milwaukee, $2.30 per bbl. less 10c. per bbl.; 300 bbl. Portland cement, f.o.b. Greenfield Park, Milwaukee, to Cities Fuel & Supply Co., 6639 West National Ave., Milwaukee, $2.50 per bbl. 5-10c. disc., for W.P.A. projects.

†MILLWORK, STEEL, etc.—**Milwaukee, Wis.** —Treas. Dpt., Procurement Div., furnishing millwork at Greenfield Park, to A. Lentz Co., 1256 North 70th St., $264•••sheet metal work, municipal garage, Shorewood, to Midwest Ventilating Wks., 123 East Pittsburgh Ave., $242 •••reinforcing steel to Brown Deer Park, to W. H. Pipkorn Co., 1548 West Bruce St., $127 •••50 manhole frames, to Nortmans Duffke Co., 2740 South 32nd St., $7 each•••50 manhole covers, to Schneider Fuel & Supply Co., 3438 West Forest Home Ave., $2 each, all for W.P.A. projects. Awarded Mar. 17.

†*Federal Government.*

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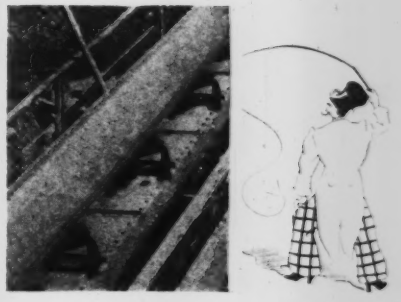

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Aggregate for the concrete, Grand Coulee Dam, Washington, is stored in these Pittsburgh-Des Moines steel bins.

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Pittsburgh
DES MOINES
STEEL COMPANY
3414 Neville Island, Pittsburgh
915 Tuttle St., Des Moines

Materials, etc. (Continued)

†**DYNAMITE, PUMPS, etc.—Milwaukee, Wis.**—U. S. Forest Service, furnishing 2¼ tons dynamite, to Trojan Powder Co., Allentown, Pa., $525***300 back pack pumps, to Hunter Tractor & Mchy. Co., 327 South 16th St., $1,800***lookout towers, to Aermotor Co., 2500 West Roosevelt Rd., Chicago, Ill., $8,100***188 fire extinguishers, to American LaFrance & Foamite Co., 911 Erie St., Elmira, N. Y., $5,721***7,500 insulators, to General Electric Supply Corp., 190 North Bway., $291***electric lighting plant, to Speeder Machine Co., 1201 6th St. S.W., Cedar Rapids, Ia., $518***fencing, to Kelly-How-Thomson Co., 5th Ave. S., Duluth, Minn., $308***poultry netting and 300 milk cans, to Marshall Wells Co., Lake Ave. S., Duluth, Minn., $327 and $906 respectively***760 planting bars, to Graybar Electric Co., Inc., 778 North Milwaukee Ave., $991***concrete mixer, to Leach Co., Oshkosh, $448. Grand total $19,935.

TRACTORS — Oshkosh, Wis. — City, mower tractors, mower with platform body, and mower with dump body, to R. L. Ryerson Co., North Pt. Washington Rd., Milwaukee, $660 and $826 respectively. Noted Mar. 2, C. D.

ASPHALT ROAD OIL—Ottawa, Ont.—City, asphalt road oil, to Imperial Oil Co. Ltd., at $21.50 per ton***cold patch and blended tar, to Currie Products Ltd., Lees St., 16c. and $12.72 per gal. respectively, also applying same, $10.52***fuel oil, to Shell Oil Co. of Canada Ltd., 134 Laurier St., 8.5c. per gal.***asphalt filler, to T. S. Kirby Co. Ltd., 215 Sussex St., Ottawa, $4.25 per ton.

FOREIGN

England, London—D. J. James Circuit Cinema House, Oxford St. West, plans theatre, $500,000***Fuel Energisers Ltd., c/o R. Roth, 39 The Vale, Golders Green N.W., plans plant for manufacturing motor fuels***Magnesium Electron Ltd., c/o G. A. Hughes & Co., Abbey House, Baker St., plans magnesium metal and alloy plant, $750,000***L. Osmont, Markfield Rd., plans factory, $500,000***Newes & Davis, Conduit Square West, plans office building for Distillers Co. Ltd., Pall Mall East, $1,000,000***Leslie Turner, 116 Victoria St. S.W., plans rein.-con. packing plant and warehouses for MacDougalls Ltd., Wheatsheaf Mills***Bernard Scott, 25 Bedford Row, E. C., plans plant for Godfrey Phillips Ltd. (tobacco manufacturers), $750,000***Spratts Patents Ltd., Cersem House, Marks Lane, E.C., plans reconstructing biscuit plant and installing new machinery, $600,000***A. A. Shaw & Co., 105a Mill Hill Rd., plans food factory for E. J. Saxow Ltd., Uxbridge Rd., $510,000***Wallis, Gilbert & Partners, Coastal Chambers, Buckingham Palace Rd. S.W., plans office building for Huntley Palmers, Kings Rd., Reading, $1,000,000*** Coal & Allied Industries Ltd., Royal Mail House, Leadenhall St., E.C., plans coal carbonization plant, $500,000***Garrett-Klement Pictures Ltd., 32 St. James St. S.W., plans constructing production studios, $800,000***Meakin Archer & Co., 127 Queen Victoria St., E.C., plans developing housing estate at Coulsdon, $1,000,000***Wates Streatham Ltd., London Rd., plans developing estate at Mitcham on 70 acres, incl. housing, sewers, roads, water, etc., $950,000***London County Council, constructing fire headquarters, to Higgs & Hill Ltd., South Lambreth Rd. S.W., $610,000***Apr. 17, by S. F. Stringer, clk., Metropolitan Water Bd., 173 Roseberry Ave., E.C., supplying and erecting 2 high compression heavy fuel oil engines with centrifugal pumps at Shortland Station***G. W. V. DeRho Philips, secy., The Madras & Southern Mahratta Ry., supplying 7 boilers, broad gage, for F.S. 2-6-4 type tank, locomotives, and 8 boilers for V.S. 0-6-0 type freight locomotives, bids should be cabled***H. H. Coley, 12a Charterhouse Sq., E.C., plans constructing 160 room hotel at Seaford, $875,000***P. D. Hepworth, 7 Grays Inn Pl., W.C., plans county building for Wilts County Council, $565,000***Ivor Power Specialty Co. Ltd., 318 Strand, W.C., plans large factory at Station Road***Cape Asbestos Co. Ltd., 26 Holburn, Victoria St., E.C., plans plant extension on London Rd., $500,000.

PUBLIC BUILDINGS

PROPOSED WORK

Ariz., Tucson—University of Arizona plans constructing women's dormitories, 6 cooperative and two non-cooperative with long center court, through grounds, $381,000. $500,000 allotted by P.W.A.

Ark., Paragould—City, W. C. Middleton, mayor, cancelled bids to have been opened Mar. 25. Revise plans and specifications, remodeling present waterworks power house, concrete machinery founds., rein.-con. oil storage tank, etc. $160,000. W. A. Fuller Co., 2916 Shenandoah Ave., St. Louis, Mo., engr. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

Calif., Sacramento—Sacramento City School Dist., revised plans by H. Devine, Cronan Bldg., constructing brick classroom unit (2nd unit), Junior College Campus. Former bids rejected. P.W.A. project. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

Georgia—Bd. Regents, State University System, Atlanta, allotted grant $338,400 P.W.A. funds for construction of following institutions, grant is 45% of total cost: dormitory State Women's College, Valdosta, $27,000; dormitory State Agricultural College, Tifton, $22,500; dormitory South Georgia Teachers' College, Statesboro, $38,250; dormitory Georgia State College, Milledgeville, $35,100; gymnasium and swimming pool, South Georgia State College, Douglas, $13,500; dormitory, North Georgia College, Dahlonega, $22,500; auditorium Georgia School Technology, Atlanta, $41,850; dormitory West Georgia College, Carrollton, $15,750; dormitory University Georgia, Athens, $121,950.

Ind., Anderson—City, City Hall, plans rehabilitating light and power plant incl. replacing present plant heater with 10,000 hp. modern type heater, $10,000; adding to present evaporator, $8,000; replacing 500 hp. boiler with new 1,200 hp. boiler and stoker, $65,000; remodeling old turbine room, $25,000; new screen house with screen pump, circulating water line and header from river, $25,000; new building and extending crane track into building; installing new turbine; new flume from river and other equipment; complete renovation of obsolete equipment; new generator. Total $475,000. The first three items will be taken care of this year, $100,000 appropriated for work for 1936. H. Gwinnup, city engr.

★ †**Mass., Bedford**—Vet. Bu., Arlington Bldg., Wash., D. C., constructing 2 patients' buildings, connecting corridors, additions to sand filters, sewage disposal plant, roads, walks, grading, etc., for U. S. Veterans Hospital. Est. about $600,000.

★ **Mo., Kansas City**—Bd. Educ., 9th and Locust Sts., soon takes bids 3 story, basement, 70x220 ft., brick high school. Meyer Blvd. and Indiana St. $700,000. P.W.A. project. Wight & Wight, 1st Natl. Bank Bldg., N. Downs, engr. Noted Nov. 6, C. D.—Nov. 14, E. N.-R.

†**N. J., Union City**—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans constructing U. S. Post Office, 32nd St. and Palisade Ave. $190,000. J. G. Helmers and Manken & Schultz, 249 Summit Ave., archts. Noted Aug. 27, 1934, C. D.—Aug. 30, 1934, E. N.-R.

★ **N. Y., Attica**—Dpt. Correction, State Office Bldg., withdraw bids to have been opened Mar. 26, constructing cell block and service connections, Attica State Prison. $800,000. **Maturity indefinite.** Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. Y., Perry—Village, W. J. Prescott, mayor, plans municipal light and power plant, incl. complete equipment. Election soon to vote on project. $200,000. L. C. Reynolds, Geneva, engr. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., South Fallsburgh—Bd. Educ., School Dist. 6, rejected bids constructing school addition. May take new bids later. P.W.A. project. E. P. Valkenburgh, 7 Linden St., Middletown, archt. Noted Feb. 17, C. D.—Oct. 10, E. N.-R., under "Contracts Awarded."

N. Y., Utica—Bd. Educ., City Hall, plans constructing Proctor High School addition, East Utica. Bagg & Newkirk, Utica Gas & Electric Bldg., archts. Special meeting to be held Apr. 1, to vote $212,000 bonds for project. If bonds are not voted, P.W.A. grant will be withdrawn.

★ **N. Y., Whitesboro**—Central School Dist. Bd. Educ., voted $650,000 bonds for constructing brick, steel central school, plain found. A. F. Gilbert, 358 5th Ave., New York, archt. Noted Dec. 18, 1935, C. D.—Dec. 26, E. N.-R.

O., Hamilton—City retained Froelich & Emory, engrs., Toledo, to design and estimate additional plant and equipment for municipal electric power plant, incl. 10,000 kw. steam turbine generator and accessory equipment, and addition to present power plant building, North 3rd St.

†**Tex., Corpus Christi**—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing U. S. Post Office and Court House, $138,000. Site purchased. Phelps & DeWees, Gunter Bldg., San Antonio, archts. Noted Dec. 5, C. D.—Dec. 12, E. N.-R.

Tex., Orange—Orange Co., R. L. Davis, judge, plans by C. H. Page, Enfield-Grocy Bldg., Austin and College Sts., 3 story, basement, 70x190 ft., stone, rein.-con., steel court house building, plain found. $200,000. The bonds as voted will be exchanged for P.W.A. funds. W. E. Simpson, Inc., Milam Bldg., San Antonio, engrs.

★ **Tex., Wichita Falls**—City, loan and grant revoked by P.W.A. for construction of municipal electric light and power plant, $1,750,000. Cancellation was brought about on account of city failure to carry recent bond issues. Status of plant construction indefinite. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

†**Vt., Beebe**—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Mar. 10, constructing inspection station. Will revise plans and readvertise for bids soon. Noted Mar. 16, C. D.—Feb. 6, E. N.-R.

Wis., Manitowoc—Bd. Educ. soon takes bids constructing Southside Junior High School, 2 story, basement, 18 rooms, gymnasium and auditorium, brick, plain found. $300,000. J. Chubb, 109 North Dearborn St., archt. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

BIDS ASKED

†**Ark., Enid Springs**—Apr. 14, by P. Wks. Administration, Housing Div., Wash., D. C., foundations for Federal Housing Project, Project 5401.

Calif., Camarillo—Apr. 21, by State Div. of Architecture, P. Wks. Bldg., Sacramento, 2 story, rein.-con. ward building, Units 6 and 7, State Hospital Grounds. G. B. McDougall, State Architect, P. Wks. Bldg., Sacramento, archt.

★ †**Calif., Los Angeles**—Apr. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., 16 story, 300x525 ft. federal building, Temple Spring and Main Sts. $6,000,000. G. S. Underwood, 408 South Spring St., consult. archt.

Calif., Los Angeles—Apr. 10, by Regents University of California, c/o Comptroller, Library Bldg., 425 Hilgard Ave., 2 story, 75x175 ft., administration building and 1 story bus depot at University. $200,000. Allison & Allison, 601 West 5th St., archts.

Conn., Milford — Apr. 8, by Town, H. N. Merwin, Bd. Selectmen, Town Hall, superstructure for brick, steel police and court unit, $105,000. L. Asheim, 211 State St., Bridgeport, archt. Noted Nov. 29, C. D.

★ †**D. C., Wash.**—Apr. 15, by Procurement Div., Pub. Wks. Branch, Wash., D. C., constructing (except elevators), additional building for U. S. Bureau of Engraving and Printing and new building for Bureau Economic Dpt. Agriculture; also elevators for both buildings. Est. about $5,500,000. Noted Mar. 2, C. D.—Mar. 26, E. N.-R.

†**Idaho, Idaho Falls**—Apr. 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. $80,000.

†**Ind., Pendleton**—Apr. 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000; adv. E. N.-R., Apr. 2.

†**Kan., Hoisington**—Apr. 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $66,000.

†**Kan., Sabetha**—Apr. 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $66,000; adv. E. N.-R., Apr. 2.

†**Md., Silver Springs**—Apr. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $100,000.

†**Mass., Boston**—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing cold room and cooling unit, etc. in U. S. Parcel Post Office.

Mich., Blissfield — Apr. 6, by Ayres, Lewis, Norris & May, engrs., Ann Arbor, furnishing installing steam piping, heating and plumbing equipment for new power plant for municipal electric power supply, for City. W.P.A. project.

†**Mich., Saginaw**—Apr. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling (except freight elevator and dumbwaiter) U. S. Post Office. $260,000.

†**Minn., Minneapolis**—Apr. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., remodeling (except elevator) U. S. Post Office. $200,000.

†**Minn., St. Paul**—Apr. 21, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing new vault, etc. in U. S. Post Office.

†**Mo., Kennett**—Apr. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

Mo., Marshall—Apr. 10, by State School for Feeble Minded, Marshall, and Bi-Partisan Advisory Bd. State Building Comm., E. M. Eagan, executive secy., Jefferson City, altering rein.-con., brick power plant and boiler house. P.W.A. project. Powers & Wells, 420 Security Bldg., St. Louis, engrs.

Mo., St. Louis—Apr. 10, by Bd. P. Serv., City Hall, furnishing, erecting complete in place 4 cross-drum straight-tube boilers with brick settings, in boiler room at City Sanatarium, Arsenal St. at Brannon Ave., $62,000; constructing, erecting in place 4 forced-draft chain grate stokers, $28,500; furnishing, erecting 1 coal conveying system, $25,000. P.W.A. project. W. C. E. Becker, city engr.

†**Nev., Carson City**—Apr. 17, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing elevator, etc., in U. S. Post Office and Court House. $25,000.

†**N. H., Wolfeboro**—Apr. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000.

N. J., Mount Holly—Apr. 15, by Rancocas Valley Regional Bd. Educ., High School, constructing Rancocas Valley Regional School, Ridgeway St. and Jacksonville Ave., incl. gymnasium and auditorium.

★ †**N. Y., Bath**—May 15, by Veterans Bureau, Arlington Bldg., Wash., D. C., constructing 3 story, basement, brick, steel hospital, plain found., $800,000. Noted Feb. 27, C. D.—Mar. 5, E. N.-R.

N. Y., Catskill—Apr. 14, by Bd. Educ., at Saulpaugh Hotel, Catskill, constructing high school building, $150,350. P.W.A. project; adv. E. N.-R., Apr. 2. Noted Dec. 9, C. D.—Dec. 12, E. N.-R.

N. Y., Dansville—Apr. 9, by Bd. Educ., general contract plumbing, heating and electrical work for constructing brick, steel school, plain found., School St. $140,000, incl. equipment. P.W.A. project. R. A. Freeburg, 1105 West 3rd St., archt. Noted Dec. 27, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

N. Y., Dryden—Apr. 10, by Bd. Educ., Central School Dist. 1, Dryden and Harford, general contract, heating, ventilating, plumbing, electrical work in connection with additions to Dryden High School. $169,000; adv. E. N.-R., Apr. 2. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

N. Y., Floral Park—Apr. 16, by Bd. Educ., constructing Senwanhaka High School addition, $350,000. Bids Nov. 21 rejected. P.W.A. project. Noted Dec. 2, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

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†*Federal Government.*

Public Buildings (Continued)

N. Y., Goshen—Apr. 15, by Bd. Supervs, Orange Co., Goshen, general contract, plumbing, heating, electrical work for county welfare home, Orange Farm. $204,000. Whitman S. Wick, 15 King St., Middletown, archt. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

N. Y., Gouverneur—Apr. 9, by A. K. Laidlaw, clk. Bd. Educ., general contract altering and constructing additions to Dean High School. $140,000; adv. E. N.-R., Apr. 2. Noted Mar. 12, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

N. Y., Johnson City—Apr. 9, by Bd. Educ., Johnson City, constructing Lincoln School. Robert St. $285,000. W. H. Whitlock, 607 Chenango St., Binghamton, archt. Noted Mar. 12, C. D.—Mar. 19, E. N.-R.

N. Y., Limestone—Apr. 14, by Union Free School Dist. 1, general contract, heating, plumbing, electrical work for school, Carroltown Rd. P.W.A. project. Bids Mar. 12 rejected. R. A. Freeburg, Freeburg Bldg., Jamestown, archt. Noted Mar. 23, C. D.—Feb. 27, E. N.-R.

★ **N. Y., Newburgh**—Apr. 22, by Bd. Educ., general contract, plumbing, heating and ventilating for school. $1,215,000. P.W.A. project. Knappe & Morris, 192 Lexington Ave., New York, archt. Noted Jan. 30, C. D.—Feb. 6, E. N.-R.

N. Y., Oneida—Apr. 25, by City Council, City Hall, superstructure, plumbing, heating, and electrical work for hospital, $308,437. P.W.A. project. Foundations awarded to Richmond & Dockstader, Oneida. King & King, 300 Dennison Bldg., Syracuse, archts. Noted Mar. 12, C. D.

N. Y., Saranac Lake—Apr. 20, by Bd. Educ., High School, constructing superstructure high school building addition. $31,743; adv. E. N.-R., Apr. 2. Noted Oct. 15, C. D.—Oct. 17, E. N.-R.

†**N. Y., Schenectady**—Apr. 7, by P. Wks. Administration, Div. Housing, Wash., D. C., demolition and disposing of buildings on site of Schonwee Village Housing Project H-5801.

N. Y., Walkill—Apr. 16 (extended date) by Dpt. Correction, State Office Bldg., Albany, constructing dairy farm building at Walkill Prison, W. E. Haugaard, Albany, state archt. T. F. Farrell, Albany, engr. Noted Mar. 24, C. D.—Mar. 26, E. N.-R.

N. Y., Windham—Central School Dist. 1 bids about May 1, general contract school. $275,000. P.W.A. project. J. Russell White, 109 State St., Albany, archt. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

†**N. C., Lincolnton**—Apr. 23, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000.

†**O., East Palestine**—Apr. 22, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $68,000.

†**O., Willard**—Apr. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $71,000.

†**Okla., Fort Sill**—Apr. 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing hospital building.

†**Okla., Poteau**—Apr. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

Ore., Salem—Apr. 13, by State Bd. Control, Portland, constructing addition to state tuberculosis hospital. $181,000. Dougan & Walworth, Studio Bldg., Portland, archts.

†**Pa., Canonsburg**—Apr. 28, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $94,000.

†**S. D., Gregory**—Apr. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $64,000.

†**Tenn., Nashville**—Apr. 15, by P. Wks. Administration, Housing Div., Wash., D. C., constructing foundations of Andrew Jackson Courts Housing Project. Project H-2102.

†**Tex., Conroe**—May 1, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $75,000.

†**Tex., Goose Creek**—Apr. 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $70,000.

†**Tex., Kaufman**—Apr. 21, by Public Works Branch, Procurement Div., Wash., D. C., constructing U. S. Post Office; adv. E. N.-R., Apr. 2.

†**Va., Rockymount**—Apr. 24, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $65,000.

CONTRACTS AWARDED

Calif., Alameda—Alameda School Dist., reconstructing high school auditorium and constructing gymnasium, Central Ave., to A. Nelson, 242 Ocean Ave., San Francisco, $111,947. P.W.A. C. Werner, 1303 Bay St., archt.

Calif., Alhambra—Bd. Educ., new school building to Steed Bros., 5 South Stoneman St., $127,384***plumbing also heating and ventilating, to A. Sordal, 722 Magnolia Ave., Los Angeles, $6,431 and $7,151 respectively*** electrical work, to J. Korb, 5724 York Blvd., Los Angeles, $6,962. Grand total $147,928. Bids Mar. 16. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Calif., Eureka—Barrett & Hilp, general contractors, 918 Harrison St., San Francisco, for City, electrical work for municipal auditorium, to Home Electric Co., Eureka***lumber, to Humboldt Milling Co., Eureka***form lumber, to E. S. Hanson, Eureka***plumbing, heating and ventilating, to J. A. Nelson, Inc., 1375 Howard St., San Francisco. **P.W.A.** Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

Calif., Fullerton—Fullerton Elementary School Dist., general contract rein.-con. auditorium building and locker room building, kindergarten and classroom building at Wilshire School, to Person & Hollingsworth, 507 South Lorena St., Los Angeles, $221,990. Subject to P.W.A. approval. Bids Mar. 19, awarded Mar. 20. Noted Mar. 6, C. D.

Calif., Los Angeles—Bd. Educ., Chamber of Commerce Bldg., painting and miscellaneous work at various schools, east building at Graham School, 1901 East Firestone Blvd., and building No. 1 at 2nd St. School, 1042 East 2nd St., to J. Ewins, 10385 Almayo Ave., $2,165 and $1,850 respectively***north and west buildings at Lorena St. School, 1015 South Lorena St., to W. G. Thompson, Stowell Hotel, $2,417***auditorium and class room annex and administration building at John H. Francis polytechnic high school, 400 West Washington Blvd., to T. A. Rucker, 1012 South Adams St., Glendale, $4,632***east building and 1924 portion of north building at Bridge St. School, 605 Boyle Ave. and main, south and domestic science buildings at James A. Foshay Junior High School, 3751 South Harvard Blvd., to D. Wein, 1709 Orchard Ave., $2,180 and $9,200 respectively. Grand total $22,444.

†**Calif., San Francisco** — Custodian, U. S. Marine Hospital, 14th Ave. and Lake St., painting Buildings 1, 6, 7, 9, 10 and 16, at U. S. Marine Hospital, The Presidio, to W. G. Thompson, 336 Church St., $2,535. Bids Feb. 26. Noted Feb. 17, C. D.

Conn., Old Saybrook—Pieretti Bros., general contractors, Centerbrook, plumbing for 2 story, basement, 60x115 ft. and two 40x50 ft. high school additions, to Marini Plumbing & Heating Co., 567 Main St., Middletown, for Town, G. B. Smith, Bd. Selectmen; electrical work, to C. King, Main St., Saybrook. Noted Mar. 11, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

Ill., Chicago—Bd. Educ. **(1)** masonry work **(2)** fireproofing **(3)** steel lockers **(4)** roofing **(5)** sheet metal **(6)** structural steel and iron **(7)** miscellaneous steel and iron **(8)** carpentry **(9)** painting **(10)** glass and glazing **(11)** plastering **(12)** terrazzo **(13)** tile **(14)** marble **(15)** heating **(16)** plumbing and **(17)** electrical work for **(A)** 2 story school, Oak Park and Foster Ave., **(B)** school, 54th St. and Oak Park Ave, **(C)** school at Hiawatha and Kilpatrick Aves., to James McHugh Sons, 6449 South Park Ave. **(1A)** $39,900 **(1B)** $44,200 **(1C)** $39,900***to C. Whitacre Fireproofing Co., 228 North LaSalle St. **(A2)** $6,535 **(B2)** $7,470 **(C2)** $6,535***to F. Medart Mfg. Co., 3535 DeKalb St., St. Louis, Mo. **(A3)** $1,156 **(B3)** $1,408 **(C3)** $1,156***to James Mansfield & Sons Co., 1645 South Pulaski Rd. **(A4)** $915 **(B4)** $1,040 **(C4)** $915***to Kitzelman Sheet Metal Wks., 4343 Cottage Grove Ave. **(A5)** $614 **(B5)** $623 **(C5)** $614***to Wendnagel & Co., 600 West Cermack Rd. **(A6)** $5,890*** to Gage Structural Steel Co., 3414 South Hoyne Ave. **(B6)** $6,668***to Eagers Iron Co., 364 North Harding Ave. **(C6)** $5,797 **(A7)** $1,880 **(B7)** $1,880 **(C7)** $1,880***to Coath & Goss, Inc., 228 North LaSalle St. **(A8)** $11,800***to Chell & Anderson, Inc., 176 West Adams St. **(B8)** $13,480***to Olson-Carlson Co., 5141 Blackstone Ave. **(C8)** $11,790***to W. Ingstrup Co., 2755 Armitage Ave. **(A9)** $2,555 **(B9)** $2,935***to A. Ladegaard, 2921 Diversey Ave. **(C9)** $2,850***to Simpson Clark Glass Co., 1680 Wright St., **(A10)** $1,239 **(C10)** $1,239***to Torstenson Glass Co., 2333 Sheffield Ave. **(B10)** $1,323***to Belson Plastering Co., 160 North La Salle St. **(A11)** $4,349 **(B11)** $4,624 **(C11)** $4,349***to Rennen Terrazzo Mosaic Co., 11 South La Salle St. **(A12)** $1,216 **(C12)** $1,216***to American Mosaic & Terrazzo Co., 1730 Carroll Ave. **(B12)** $1,274 ***to McWayne Co., 609 North Wells St. **(A13)** $777 **(C13)** $777***to J. Caretti & Co., 66 West Ohio St. **(B13)** $788***to Davia Bros. Marble Co., 2410 South La Salle St. **(A14)** $450 **(C14)** $460***to J. B. Clow & Sons, 2338 South Western Ave. **(B14)** $468***to Robert Gordon, Inc., 419 North State St. **(A15)** $10,968 **(B15)** $11,644 **(C15)** $10,968***to Economy Plumbing & Heating Co., 1308 South Crawford Ave. **(A16)** $7,398 **(C16)** $7,400***to S. Kersten, 206 South Jefferson St. **(B16)** $7,367 ***to Casey Electric Service Co., 1534 West Lake St. **(A17)** $6,780 **(B17)** $7,580***to Chester Johnson Electric Co., 26 North Jefferson St. **(C17)** $7,223. Grand total $324,263. **P.W.A.** Bids Feb. 18. Noted Feb. 25, C. D.—Feb. 13, E. N.-R.

★ **Ill., Springfield**—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, general contract constructing arsenal and office building, Monroe, 1st and Adams Sts., to United States Fire Proofing Co., Builders Bldg., Chicago, $897,540*** pipe covering, to Illinois Phillip Carey Co., 2100 Fullerton Ave., $15,635***electrical work, to Kalso Burnett Electric Co., 223 West Jackson St., Chicago, $101,504***plumbing, to Carson Payson Co., 616 North Jackson St., Danville, $66,664***elevators, to Otis Elevator Co., 600 West Jackson Blvd., $44,800***foundations for archives building, to J. L. Simmons Co., 101 North 5th St., $64,444***control equipment with housing and five standard 8 ft. detector pads complete, to Automatic Signal Corp., 400 North Michigan Ave., Chicago, $969 and $150 respectively. Grand total $1,191,706. **P.W.A.** Bids Mar. 10. Noted Mar. 6, C. D.—Feb. 27, E. N.-R.

†**Ky., Carrollton**—Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office, to Di Blasio Building Co., 410 Canton Bank & Trust Bldg., Canton, O., $44,000. Bids Feb. 18. Noted Feb. 24, C. D.—Jan. 16, E. N.-R.

†**Md., Havre de Grace**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to Eastern Constr. Co., 705 Greenwood Ave., Trenton, N. J., $48,900. Bids Oct. 28. Noted Oct. 31, C. D.—Oct. 3, E. N.-R.

Mass., Medford — M. S. Kelliher Co., 38 Chauncy St., Boston, general contractor, excavation for city hall, Salem St., to R. E. Cunniff, 393 Brookline St., Newton Center for City, J. J. Irwin, City Hall, mayor. Noted Feb. 21, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Mass., Quincy—M. Slotnick Co., general contractors, 333 Washington St., Boston, heating for 3 story, basement, 50x120 ft., brick, steel administration unit at City Hospital, to J. W. Praught & Co., 1049 Dorchester Ave., Dorchester, for City***plumbing, to Henry F. Nation & Co., 479 Cambridge St., Brighton***electrical work, to Mass. Electric Constr. Co., Inc., 333 Washington St., Boston. Noted Feb. 6, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

Mass., Quincy—S. J. Sullivan Co., general contractors, 83 Newberg St., Roslindale, heating, for municipal garage, to Acme Heating & Ventilating Co., 13 Hawkins St., Boston, for City***plumbing, to Hibbett Plumbing Co., 28 Chestnut St.***electrical work, to Quinn Bros., 239 A St., South Boston. Noted Feb. 20, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Mass., Somerset—L. M. Witherell & Sons, general contractors, 29 Court St., Taunton, excavating for 2 story, basement, 60x220 ft., brick, steel high school to Montaup Sand & Gravel Co., Swansea, for Town, F. L. Hanson, chn. Building Comn. Noted Feb. 28, C. D.—Mar. 5, E. N.-R., under "Contracts Awarded."

Mass., Spencer—J. W. Bishop Co., general contractors, 109 Foster St., Worcester, excavating for 2 story, 90x140 ft., brick, steel high school addition at David Prouty School, to Dooley Bros., 39 George St., Roxbury, for Town, supt. of Schools. Noted Jan. 14, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Mo., Neosho—Newton Co., C. E. Jeffrey, clk., general contract 3 story, basement, 91x112 ft., concrete, brick, stone court house, to S. Patti Constr. Co., 1114 Bway., Kansas City, $162,687 ***steel jail equipment, to Southern Prison Co., 4700 South Presa St., San Antonio, Tex., $11,150. **P.W.A.** Bids Mar. 21. Noted Feb. 26, C. D.—Mar. 5, E. N.-R.

Mo., Rolla — Missouri School of Mines & Metallurgy, University of Missouri, C. H. Fulton, dir., Rolla, rebuilding parapet walls and other repairs, to Mississippi Valley Experiment Station Bureau Building and Testing Laboratory, and rebuilding parapet walls and altering Jackling Gymnasium, to J. E. Hathman, Columbia, $12,209. **P.W.A.** Bids Mar. 11. Noted Mar. 5, C. D.

N. J., Elizabeth — City, Bd. Educ., Batten High School, South Broad St., general contract Junior High School, 5th Ward, to Auf der Heide-Aragona, 530 Jackson St., West New York, $236,155***steel and iron, to Breen Iron Wks., Bloy St. and Ramsey Ave., Hillside, $50,110***heating and ventilating, to A. Arace & Sons, 642 3rd Ave., $53,767***plumbing, to J. E. Joyce, 84 South 6th St., Newark, $24,725***electrical work, to Industrial Electric, Inc., 277 North Broad St., $33,038. Grand total $403,795. **P.W.A.** Noted Dec. 26, C. D.

N. J., Leonia—Bd. Educ., Leonia High School, general contract high school addition, Bergen Co., to C. A. Vezzetti, 50 State Rd., Palisade, $99,845***steel and iron, to Lafayette Iron Wks., 649 Grand St., Jersey City, $7,274*** heating and ventilating, to G. Stewart, 270 South 20th St., Newark, $21,808***plumbing, to W. Zabransky, Jr., Inc., 19 Pickens St., Little Ferry, $8,468***electrical work, to Bush Bros., Inc., 101 West Palisade Ave., Englewood, $21,480. Grand total $158,875. **P.W.A.** Noted Feb. 27, C. D.—Mar. 5, E. N.-R.

N. J., Trenton—State, Dpt. Institutions & Agencies, State House, reconstructing fireproofing wards, Westside Main Building Hospital, brick setting for boilers awarded to Mack Enz. & Supply Co., 136 Liberty St., New York, $6,488. **P.W.A.**

N. M., Albuquerque—City, general contract 3 story, 65x165 ft. high school, to Lembke Constr. Co., Albuquerque, $107,850***plumbing to Albuquerque Plumbing & Heating Co., Albuquerque, $4,942***heating, to W. T. Cooper, Albuquerque, $7,531***electrical work, to Testman Electric Co., Albuquerque, $6,589. Grand total $126,912. **P.W.A.** Bids Mar. 6. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. Y., Brooklyn—Dpt. Hospitals, Municipal Bldg., general contract Red Hook-Gowanus Health Center, to Sheppard Pollak Co., 18 East 48th St., New York $155,380***plumbing, to Fox Plumbing 1486 Coney Island Ave., $14,480 ***heating, to H. Sand & Co., Inc., 158 Greene St., New York, $13,659***electrical work, to H. H. Schwartz, Inc., 105 Court St., New York, $16,150. Grand total $199,668. **P.W.A.** Bids Feb. 26. Noted Feb. 27, C. D.—Feb. 13, E. N.-R.

N. Y., Buffalo—C. H. Everitt, general contractor, 295 Auburn Ave., Buffalo, structural steel for county office building, West Eagle St.,

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†*Federal Government.*

Public Buildings (Continued)

for Bd. Supervs. Erie Co. County Hall, to Buffalo Structural Steel Corp., 166 Dart St. **P.W.A.** Noted Jan. 24, C. D.—Jan. 30, E. N.-R., under "Contracts Awarded."

N. Y., Candor—Union Free School Dist. 9, general contract constructing school, to F. W. O'Connell, 329 Water St., Binghamton*** plumbing, to C. W. Rishell, 109 Washington Ave.***electrical work, to A. C. Smith, 615 South St., Endicott***heating, to F. Bradt Co., Inc., 515 Oakwood Ave., Syracuse. **P.W.A.** Bids Mar. 9. Noted Mar. 16, C. D.—Mar. 5, E. N.-R.

N. Y., Clarence—Gambin Constr. Co., general contractors, 31 Harriett St., Buffalo, structural steel for school, Park Ave., for Union Free School Dist. 1, to Ernst Iron Wks., 75 Lathrop St., Buffalo***reinforcing steel and steel joists, to Truscon Steel Co., Sidway Bldg., Buffalo*** marble and tile, to Italian Mosaic & Marble Co., 1085 East Delavan Ave., Buffalo. **P.W.A.** Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

N. Y., Chester—G. S. Stanley Irish, general contractor, Colvin St., painting School, Maple Ave., for Bd. Educ., Chester, to Nephew & Keene, 259 West Borden Ave., Syracuse*** masonry work, to Littlejohn, Bowling & Morris, Grand Central Station, New York***marble and tile, to A. Mion & Son, Inc., 428 Michigan Ave., Schenectady. **P.W.A.** Noted Jan. 6, C. D.—Jan 9, E. N.-R.

★ **N. Y., East Rochester**—Union Free School Dist 13, general contract school, East Ave., to Stewart & Bennett, Inc., 126 North Water St., Rochester. Est. $500,000. **P.W.A.** Awarded Mar. 18. Noted Mar. 20, C. D.—Mar. 5, E. N.-R.

N. Y., Glens Falls—Bd. Educ., Union School Dist. 1, general contract school, Sagamore Ave., to Duplex Constr. Co., 149 Glen St., Glens Falls. Est. $342,000. **P.W.A.** Bids Mar. 15. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

N. Y., Glens Falls—Bd. Educ., Union Free School Dist., Queensbury plumbing for school, to Cohn & Kramer, Inc., 48 Grand St., Albany ***heating, to Dierks Heating Co., Inc., 210 East 31st St., New York***electrical work, to E. G. May, 51 Central Ave., Albany. **P.W.A.** Bids Mar. 15. Noted Mar. 30, C. D.—Mar. 5, E. N.-R.

N. Y., Hamburg—Bd. Educ., general contract constructing school, to Siegfried Constr. Co., 6 North Pearl St., Buffalo***plumbing, to M. Speth, 11 Columbia Parkway, Buffalo***heating, to J. Davis, Root Bldg., Buffalo***electrical work, to Wipperman Mitchell, 404 North Oak St., Buffalo. **P.W.A.** Bids Mar. 9. Noted Mar. 16, C. D.—Feb. 27, E. N.-R.

N. Y., Hogansburg—DeRiso Bros., Inc., general contractors, 410 Bergenline Ave., West New York, roofing for school, at St. Regis Indian School, for State Dpt. Educ., State Office Bldg., Albany, to Umland Bros., 868 Jefferson Ave., Buffalo***plastering and lathing to Sherman Plastering Co., 51 East 42nd St., New York*** reinforcing steel, to Bethlehem Steel Co., 25 Bway., New York. **P.W.A.** Noted Mar. 23, C. D.—Mar. 26, E. N.-R.

N. Y., Kendall—Central School Dist. 7, general contract school, to J. B. Pike & Son, 1 Circle St., Rochester***plumbing, to Dayton Pettit, Wilson***heating, to E. J. Leary, 45 Stanley St., Buffalo***electrical work, to Conhrady Langschwager, 140 Curtis St., Rochester. Est. $220,000. **P.W.A.** Bids Mar. 13. Noted Mar. 20, C. D.

N. Y., Kenmore—Town of Tonawanda and Village of Kenmore, general contract municipal building, Delaware Ave., to John W. Cowper Co., Rand Bldg., Buffalo***plumbing, to J. J. Bresnahan, Inc., 41 Pearl St., Buffalo***heating, to J. Davis Root Bldg., Buffalo***electrical work, to Ferguson Electrical Co., 204 Oak St. Est. $211,810. **P.W.A.** Bids Mar. 13. Noted Mar. 26, E. N.-R.

N. Y., Newburgh—Bd. Educ., general contract school, Monument St., to W. L. Crow Co., 101 Park Ave., New York***heating and ventilating, to T. G. Egan Refractory Eng. Co., 70 Kane St., Brooklyn***electrical work, to Cleveland & Ryan, 140 Cedar St., New York. Est. $461,300. **P.W.A.** Noted Feb. 18, C. D. —Feb. 6, E. N.-R.

N. Y., New York—Dpt. Health, 125 Worth St., general contract constructing Central Harlem Health Centre Building, to A. A. Lutz Co., 300 Madison Ave., $183,900***plumbing, to Fox Plumbing Co., 103 Park Ave., New York, $12,393***heating, to H. Starkman & Bros., 132 Brook Ave., $19,400***electrical work, to Union Electric Co., 247 Park Ave., $14,458. Grand total $203,151. **P.W.A.** Bids Feb. 5. Noted Feb. 7, C. D.—Jan. 23, E. N.-R.

N. Y., North Collins—Bd. Educ., general contract constructing school, to Metzger Constr. Corp., 429 Carlton St., Buffalo. Est. $185,000. **P.W.A.** Noted Mar. 20, C. D.—Feb. 27, E. N.-R.

N. Y., North Collins—Bd. Educ., North Collins, plumbing for school, Church St., to Fish & Kronenberg, Main St., Hamburg, $8,212*** heating to Quackenbush & Co., 597 Michigan Ave., Buffalo, $18,887***electrical work, to Wipperman & Mitchell, 404 North Oak St., Buffalo, $9,495. Grand total $36,594. **P.W.A.** Bids Mar. 16. Noted Mar. 30, C. D.—Feb. 27, E. N.-R.

†**N. Y., Oswego**—B. Z. Contracting Corp., general contractors, 52 Vanderbilt Ave., plumbing and heating for U. S. Post Office, West Oneida St., for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Davmor Plumbing & Heating Co., 3311 28th Ave., Long Island City***roofing, to Umland Bros., Inc., 868 Jefferson Ave., Buffalo. Noted Oct. 7, C. D.—Oct. 10, E. N.-R., under "Contracts Awarded."

N. Y., Rome—A. E. Stephens Co., general contractor, 1200 Main St., Springfield, Mass., structural steel for children's building Rome State School, to Belmont Iron Wks., 22nd and Washington Sts., Phila., Pa.***cut stone, to Ingalls Stone Co., Bedford, Mass.***roofing, to Central City Roofing Co., East Erie Blvd., Syracuse***marble and tile, to Schenectady Marble & Tile Co., 785½ State St., Schenectady, for Dpt. Mental Hygiene, State Office Bldg., Albany. Noted Feb. 11, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

★ **N. Y., Stamford**—Bd. Educ., Central School Dist., foundations for school, River St., to E. F. and W. S. Govern, Stamford. **P.W.A.** Bids Mar. 23. Soon takes bids on superstructure. Total $500,000. Noted Mar. 30, C. D.—Mar. 19, E. N.-R.

N. C., Winston Salem—President Winston Salem Teachers College, Winston Salem, heating improvements, Sects. 1, 2 and 3, to Bagwell Plumbing & Heating Co., Durham, $23,232. Est. $38,000. Bids Mar. 17. Noted Mar. 11, C. D.—Jan. 16, E. N.-R.

★ **N. D., Grand Forks**—City, C. J. Evanson, aud., constructing power plant building, equipment and distribution system, to Donovan Constr. Co., 1725 Carroll St., St. Paul, Minn., $650,000. **P.W.A.** Noted Dec. 20, C. D. —Jan. 2, E. N.-R.

O., Cleveland—City, constructing two 3 story, basement cottages and swimming pool, Oakes Rd., relief labor. Est. $475,000. Materials to be purchased by A. C. Gray, deputy state purch. act., for P.W.A., Pure Oil Bldg., Columbus. H. Kregelies, 517 City Hall archt.

★ **Pa., Scranton**—Scranton School Dist., J. Eckersely, secy., general contract constructing Junior High School at Maple St. and Slocum Ave., to E. S. Williams, 342 New St., $1,071,245***heating and ventilating to F. P. Farrell, 269 Camden St., Newark, N. J., $131,685***plumbing and drainage, to E. A. Campagna, 818 West Lackawanna Ave., $41,652*** electrical work, to Conestoga Electric Co., Lancaster, $46,180. Grand total $1,290,762. All subject to P.W.A. approval. Bids Mar. 23. Noted Mar. 25, C. D.

†**Tenn., Knoxville**—Tennessee Valley Authority, Knoxville, constructing electric elevator at Wheeler Power Plant, to Warner Elevator Co., 2613-31 Spring Grove St., Cincinnati, O., $21,560. Bids Feb. 3.

Wis., Milwaukee—Wisconsin Consistory, 713 East Wells St., remodeling and constructing 3 story, 150x170 ft. addition to consistory, masonry work, to H. Rieser, 3278 North Humbolt Ave.***carpentry, to F. Kath, 8535 West North Ave.***concrete, to F. Wilke, 3047 North 36th St.***cut stone, to Vollbrect Cut Stone Co., 139 South 16th St.***plumbing, heating, ventilating, to Wenzel & Henock Co., 1524 North 27th St.***sheet metal and slate roofing, to Biersach & Niedermeyer, 1937 North Hubbard Ave.***plastering, to J. Gregory, 2503 Lefeber Ave.***ceramic and asphalt tile, to N. F. Durner Co., Inc., 815 West St. Paul Ave.***painting and decorating, to J. Meier, 1911 Underwood Ave.***electrical work, to S. Heller Electric Co., 240 North Milwaukee Ave. ***terr., to Stork Mantel & Tile Co., 2516 West North Ave. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

Wis., Waupaca—Waupaca Co., 1 and 2 story, part basement, 80x100 ft., brick, steel garage, W.P.A. labor***heating, to Quall Plumbing Co., Clintonville***plumbing, to Oscar Burns, Waupaca***reinforcing steel, to Concrete Eng. Co., 176 West Wisconsin Ave., Milwaukee***brick, to C. Gmeimer, Waupaca. Structural steel, steel sash, glazing, overhead door and lumber to be purchased by W.P.A.

†**T. H., Pearl Harbor**—Pioneer Constr. Co., general contractors, Lloyd Bldg., Seattle, Wash., 800 tons structural steel for quarters for P. Wks. Officer, Pearl Harbor, to Virginia Bridge Co., Roanoke, Va. Noted Mar. 24, C. D.— Mar. 26, E. N.-R.

†**England, London**—State Dpt., Wash., D. C., general contract embassy building, Grosvenor Sq., to Hegeman Harris Co., 360 Madison Ave., New York. Est. about $150,000. John Russell Pope, 542 5th Ave., New York, and Rosario Candela, 578 Madison Ave., New York, N. Y., archts.

COMMERCIAL BUILDINGS

PROPOSED WORK

D. C., Wash.—Kay Constr. Co., c/o G. T. Santmyers, 1410 H St. N.W., soon lets separate contracts apartments, Rhode Island Ave. N.E. $200,000.

Ill., Chicago—Marshall Field & Co., State and Washington Sts., soon takes bids furnishing, installing double escalators from sub basement to 9th floors to replace elevators. Graham, Anderson, Probst & White, 80 East Jackson St., archts.

Mass., Boston—Owner, c/o I. Richmond, archt. 248 Boylston St., making plans 3 story, 35x105 ft., brick, steel, stone store, warehouse and office building, concrete found., Commonwealth Ave. and Kenmore St. To exceed $140,000.

★ **Mich., Detroit**—Henry Ford Hospital, W. Grand Blvd., sketches by Albert Kahn, I New Center Bldg., 7 story, brick, stone, st concrete hospital, addition; plain found., W Grand Blvd. $750,000.

N. Y., Brooklyn—Brookshire Realty Co 20-27 East 37th St., plans by I. Kallich, Fulton St., constructing group 1 story dwelli 1770 East 33rd St. $140,000 or more.

N. Y., Brooklyn—Eden Homes, Inc., Kings Highway, plans by I. Kallich, 375 F ton St., constructing group 2 story, brick dw ings, 1770 East 28th St. $140,000.

N. Y., Brooklyn—Lion Homes, Inc., Nostrand Ave., plans by I. Seelig, 1766 E 8th St. constructing group 2 story, frame dw ings, 132 Dover St. and vicinity, $140,000.

N. Y., Brooklyn—Org Realty Corp., Kings Highway, plans by B. Govern, 1060 O Ave., constructing 6 story, brick apartm plain found., 542 South Prospect Park. $15 000.

N. Y., Brooklyn—Halperine Realty Co., Joralemon St., sketches by R. T. Schaefer, 2 Nostrand Ave., group brick dwellings, 19 East 33rd St. and vicinity, $140,000 or more

N. Y., Idlewild (near Hollis)—Idlew Mansion, Inc., 424 Albany Ave., Brooklyn, pla by W. Sambur, 162-02 Jamaica Ave., Jamai plans 1 story, brick dwellings, 157th St. a 45th Rd. $140,000.

N. Y., Irvington—E. A. Matthiessen, Irvington, and 5 East 57th St., New York, mak plans constructing group of residences, Nor Bway. overlooking Irvington Reservoir. To ceed $140,000. Private plans.

N. Y., Jackson Heights—M. Brait, 2 Montague St., Brooklyn plans by D. J. Levins 161-02 84th Dr., Jackson Heights, group 2 sto brick, dwellings, 86th St. near 30th Ave $140,000.

N. Y., Kew Gardens—Blumor Homes Corp 106-11 105th St., Jamaica, sketches by D. Levinson, 161-02 84th Dr., Jamaica, group story, frame dwellings, Chevy Chase Rd. and Grand Central Parkway. $140,000.

N. Y., Lakemont—Starkey Seminary, J. Long, pres., plans new school buildings and installing equipment. To exceed $140,000. Architect and engineer not appointed.

N. Y., Laurelton—Menben Realty Corp., 360 Kings Highway, Brooklyn, plans by A. MacLean, 153-39 8th Ave., Jamaica, constructing group frame dwellings, 217th St. and 131st Ave $140,000.

N. Y., Long Island City—Sunwood Realty Co 13-90 31st St., Astoria, plans by C. J. Stidolph 87-01 51st Ave., Elmhurst, constructing group 4 story, tenements, 41st St. and 47th Ave. and vicinity. $140,000.

N. Y., Monroe—A. T. Haight, c/o Monroe Colony Corp., Lake Walton, plans constructing community development, incl. frame dwellings To exceed $150,000.

N. Y., New York—American Bible Society 4th Ave. and 8th St., plans by J. Bleich, 565 East Tremont Ave., altering heating, plumbing in two 4 story apartments, 335 East 85th St $37,000 with fixtures.

N. Y., New York—A-C-L Realty Corp., 49 Elizabeth St., plans by A. L. Wilson, 276 5th Ave., altering heating, plumbing in two 5 story apartments, 312 East 116th St. $45,000.

N. Y., New York—Associated Dry Goods Co (Lord & Taylor Dpt. Store), 4 West 35th St plans modernizing department store, incl. air conditioning, 5th Ave. and 38th St. Est. $150,000.

N. Y., New York—Gefree Realty Corp., 17 East 42nd St., plans by S. L. Strauss, 41 Union Sq., 6 story apartment, 322 East 75th St. $225,000.

N. Y., New York—International House, 500 Riverside Dr., plans by Allen, Collins & Willis c/o owner, altering 10 story club, incl. heating plumbing, 151 Claremont Ave. $40,000.

N. Y., New York—Kossuth Realty Co., c/o Horstmann & Kozinn, 384 East 149th St., plans 6 story apartment, 208th St. and Kossuth Ave. To exceed $150,000. Site acquired.

★ **N. Y., New York**—One Thousand Four Hundred Forty-Eight Bway. Realty Corp., 440 Bway., plans by L. A. Abramson, 25 West 45th St., altering office building and restaurant, 41st St. and Bway. $500,000.

N. Y., New York—G. W. Perkins, 342 Madison Ave., plans by G. P. Butler, Jr., 40 East 49th St., altering heating, plumbing in two 4 story apartments, 8 East 94th St. $50,000 with fixtures.

N. Y., New York—Titusville Realty Corp., 40 West 40th St., plans by J. A. Fouilhoux, 40 West 40th St., constructing 5 story, brick, steel showrooms and office, plain found., 46 West 40th St. $350,000. American Radiator Co., 40 West 40th St., lessee. Demolition, to Walsh Wrecking Co., 46 West 40th St.

N. Y., Olean—Emanuel Lutheran Church, 415 Laurens St., plans by Bley & Lyman, 505 Delaware Ave., Buffalo, brick, stone church, North 4th and Laurens Sts.

N. Y., Pawling—Pawling Boys School, North Rd., plans nearing completion by H. C. Pelton, 415 Lexington Ave., New York, and takes bids late in spring constructing 3 story, basement, 46x470 ft., brick, steel science building, plain found. To exceed $140,000.

†*Federal Government.*

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Commercial Buildings (Continued)

N. Y., Rochester—S. Firestone, archt., 59 South Ave., bids in April, brick, concrete dormitory, plain found., 1162 Paul St., for Jewish Home for Aged, St. Paul St.

N. Y., St. Albans—Efficient Homes, Inc., 161-19 Jamaica Ave., Jamaica, plans by A. MacLean, 153-39 88th Ave., Jamaica, constructing group brick dwellings, 227th St. and 115th Rd. $140,000 or more.

N. Y., St. Albans—St. Albans Federal Homes, 221st St. and Linden Blvd., plans group additional dwellings, vicinity 221st St. and Linden Blvd. To exceed $200,000.

N. Y., Schenectady — Eastern New York Orthopedic Hospital School, Inc., 1090 Baker Ave., plans by J. M. Ryder, 122 Jay St., brick, steel hospital addition, plain found., and equipment, 124 Rosa St. $140,000 or more.

N. Y., Utica—Bergers Department Store, 350 Columbia St., plans remodeling department store and constructing addition, 350 Columbia St. Architect not appointed.

Va., Staunton—Warner Bros. Theaters, 321 West 44th St., New York, bids late in April, rebuilding burned theater. $140,000 or more. J. Eberson, 1560 Bway., New York, archt. Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

BIDS ASKED

Mo., St. Louis—Sisters of Mercy c/o St. Johns Hospital, 307 South Euclid Ave. bids about Apr. 15, 4 story, basement, rein.-con., brick, stone, home for business women, with 6 story, tower, on 398x446 ft. site, Maryland and Newstead Aves. Est. about $235,000. H. P. Hess, Ambassador Theatre Bldg., archt.

N. Y., Cortland—Schine Chain Theatre Corp., 40 West Main St., Gloversville, taking bids altering theatre into department store and constructing addition. $140,000. P. M. Hulsken & L. T. Strong, 505 Savings Bank Bldg., Lima, O., archts. Sears Roebuck & Co., Arthington St., Chicago, Ill., lessee. Noted Dec. 16, C. D. —Dec. 19, E. N.-R.

N. Y., Douglaston—See "Contracts Awarded."

N. Y., Flushing—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., Richmond Hill — See "Contracts Awarded."

N. Y., Syracuse—Owner, c/o Eagen Realty Co., 212 Harrison St., taking bids complete rewiring and new electrical fixtures for Gridley Building, South Salina. King & King, Denison Bldg., engrs.

O., Cleveland—Mastercraft Constr. Co., c/o C. Babich, Builders Exchange Bldg., taking bids on materials for 30 brick, frame houses. Total est. $200,000. Private plans.

CONTRACTS AWARDED

Calif., Alameda—Levin & Oppen, et al, 745 Clement St., San Francisco, general contract theatre, Central and Park Aves., to Cahill Bros., 206 Sansome St., San Francisco, $150,000; structural steel, to Herrick Iron Wks., 18th and Campbell Sts., Oakland•••electrical work, to Alta Electric & Mechanical Co., 467 O'Farrell St., San Francisco. Awarded Mar. 18.

Calif., Fresno—B. H. Cory, Cory Bldg., Fresno, air conditioning system for 4 story office building at Fulton and Fresno Sts., to York Ice Mchy. Co., 234 9th St., San Francisco, $30,000.

Calif., San Francisco — Meyer Constr. Co., general contractors, 735 Portola Dr., elevators for 10 story, rein.-con., steel apartment, Broadway and Buchanan Sts., to Atlas Elevator Co., 34 Harriet St., for L. A. Meyer, c/o contractors •••sheet metal, to Sheet Metal Service Co., 213 Octavia St.•••electrical work, to Lindy Electric Co., 463 24th Ave.•••millwork, to Hayman Building Supply Co., 735 Portola Dr.•••ornamental iron, to Star Ornamental Iron Wks., 1271 Folsom St.•••marble, to Eisele & Dondero, 2895 3rd St.•••structural steel, to McClintic-Marshall Co., 20th and Illinois Sts. Noted Jan. 30, C. D.—Feb. 6, E. N.-R., under "Contracts Awarded."

Ill., Chicago — Catholic Bishop of Chicago, general contract 3 story, basement, 124x157 ft., school and chapel, for St. Ferdinand Parish, 3115 North Mason Ave., to Henry Bros., 7300 South Calumet St., $157,000. Bids Mar. 6. Noted Mar. 19, C. D.

Mich., Detroit—Singer Sewing Machine Co., Stephenson Bldg., 6 story, basement, brick, steel, stone, rein.-con. store and office building, plain found., Woodward Ave., to A. A. Albrecht Co., 1201 Penobscot Bldg. Est. $150,000. Noted Jan. 15, C. D.—Jan. 2, E. N.-R.

Mo., Kirksville—Kirksville College Osteopathy & Surgery, G. M. Laughlin, pres., general contract 2 story, basement, 53x90 ft., rein.-con., brick, stone clinic building, to L. F. Poehlman, Kirksville. Bonsack & Pearce, Inc., 411 Olive St., St. Louis, archts. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Neb., Lincoln — First National Bank, 10th and O Sts., air conditioning 8 story bank, to Natkin Eng. Co., 2020 Wyandotte St., Kansas City, Mo., about $50,000.

Neb., Omaha—Holy Cross Parish, 5056 Center St., general contract church and school, 48th St. and Woolworth Ave., to P. McArdle, 526 South 51st Ave., $115,000. Lahr & Stangel, Omaha, archt.

Neb., Omaha—Kresge Stores, 402-406 South 16th St., air conditioning equipment in local store, to Carrier Eng. Corp., 117 North 16th St. Est. $40,000.

N. Y., Douglaston—Krugonad Realty Corp., 85-35 Parsons Blvd., Jamaica, constructing group frame dwellings, Overbrook Pl. near Van Zandt Ave., day labor and separate contracts. $140,000. W. P. Labellee, c/o owner, archt.

N. Y., Douglaston—United Associates Homes, S. A. Gogel, pres., 245th St. and Northern Blvd., group brick dwellings (3rd unit), 245th St. and Northern Blvd., day labor and separate contracts. $140,000. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Flushing — Rocky Hill Development Corp., Rocky Hill Rd. and Cross Island Blvd., constructing group air conditioned dwellings, Rocky Hill Rd. and Cross Island Blvd., separate contracts. $140,000. G. M. Seglin, c/o owner, archt.

N. Y., New York—R. H. Macy & Co., Bway. and 34th St., addition to air conditioning in department store, to Carrier Eng. Co., 850 Frelinghuysen Ave. Est. $95,000.

N. Y., New York—Harbin Realty Co., B. Epstein, pres., 4376 Bway., constructing 5 story, brick apartment, 25 Cooper St., day labor and separate contracts. $150,000. G. G. Miller, 40 East 49th St., archt.

N. Y., New York—Victor Land Corp., 612 West 145th St., 6 story, brick, steel apartment, plain found., 178th St. and Anthony Ave., separate contracts now being awarded. $275,000. J. M. Felson, 250 West 57th St., archt. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

N. Y., Richmond Hill — A. Gallo, 127-05 Merrick Rd., constructing group brick dwellings and stores, Rockaway Blvd. and 107th St., day labor and separate contracts. $140,000. Lama & Proskauer, 383 Jay St., Brooklyn, archts. Noted Feb. 27, C. D.—Mar. 5, E. N.-R.

N. Y., Schenectady—Walsh Bros., general contractor, 150 Hampshire St., Cambridge, Mass., reinforcing and structural steel for church, State St., for St. Lukes Roman Catholic Church, 1202 State St., to James McKinney & Son, 925 Bway., Albany; metal lathing and plastering, to Henderson, Johnson Co., 1407 Erie Blvd., Syracuse. Noted Feb. 7, C. D.—Feb. 13, E. N.-R.

★ **N. Y., Syracuse**—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, constructing express service building and power plant, near New Station, to Duffey Constr. Co., 230 Park Ave., New York, $230,731•••power house equipment, to Edward Joy Co., 133 Market St., Syracuse, $236,340••• various railroad buildings, to Gorsline & Swan Constr. Co., 96 Pearl St., Rochester, $114,180. •••General contractor awarded contract all concrete and masonry work, to Edison Concrete Corp., 155 East 42nd St., New York. Grand total $581,251. Noted Mar. 11, C. D.

N. Y., Syracuse—W. M. Ballard, general contractor, City Bank Bldg., structural steel for signal station for New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, to Smith & Caffrey Co., 2611 Lodi St.•••plumbing, heating and electrical work, to Edward Joy Co., 133 Market St.•••roofing, to Sheridan Roofing Co., 819 West Fayette St. •••reinforcing steel, to Brewster & Williams, Inc., Dillaye Bldg. Noted Oct. 2, C. D.—Oct. 10, E. N.-R., under "Contracts Awarded."

N. Y., Tonawanda — Mount St. Mary's Academy, Delaware Ave., general contract girls academy, Delaware Ave., to Balling Bros., 401 Bennett St., North Tonawanda•••plumbing, to C. Holler, 119 Grove St., Buffalo•••heating, to Roger Moran, 397 East Utica St., Buffalo••• electrical work, to Sterns Electric Co., 65 Bway., Buffalo. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

Que., Longue Pointe—Sisters of St. Jean de Dieu Hospital, rebuilding northern wing of main building, to Dausereau, Ltd., Montreal, $140,000, cost plus percentage basis. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Dos Palos — CREAMERY — Gustine Creamery, Gustine, plans rein.-con. creamery, $40,000 incl. equipment. Architect not appointed.

★ **Calif., Oakland**—FACTORY—Owens-Illinois Pacific Coast Co., 1855 Folsom St., San Francisco, P. D. Burtt, vice-pres. in charge of construction, making plans group of 4 manufacturing buildings, brick and "insulux glass" construction, corrugated iron and composition roofing, etc., comprising initial unit of glass manufacturing plant, Fruitvale and Alameda Aves. $1,500,000 or more. K. Theill, 580 Market St., San Francisco, engr. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

Mich., Muskegon—FACTORY—Standard Auto Parts, 660 Nims St., plans by R. Allen, archt. and engr., 610 Lafayette St. S.E., Grand Rapids, factory addition. To exceed $39,000.

Mo., St. Louis—DAIRY—Mar. 31, by St. Louis Dairy Co., B. M. Lide, Jr., pres., 2000 Pine St., constructing 2 and 3 story, basement, 100x1,209 ft., brick concrete dairy plant; 1 story 72x233 ft. garage building and altering Buildings 1 and 2, between 20th, 21st, Pine and Chestnut Sts. G. W. Wolf, 2000 Pine St., archt. J. K. Anderson, Pittsburgh, Pa., engr. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Mo., St. Louis—MARKET—Schenberg's Markets, Inc., 3853 South Bway., soon takes bids constructing 1 story, basement, open style market, incl. complete refrigeration. $50,000. H. W. Guth, 427 Buder Bldg., archt.

Montana — SHOP BUILDINGS — Northern Pacific Ry. Co., B. Blum, ch. engr., St. Paul, Minn., improving and enlarging shop buildings, incl. round house stalls, lengthening turntables, new coal docks, track changes and strengthening bridge at Livingston, Helena and Missoula. $219,000.

Neb., Lincoln—TILE WORKS—Lincoln Brick & Tile Wks. plans constructing tile works. To exceed $37,000. **Maturity indefinite.** Architect not appointed.

★ **Neb., Omaha**—PACKING HOUSE—Armour & Co., 30th and Q Sts., soon takes bids from private bidders constructing concrete plant addition. $500,000. F. A. Linberg, c/o Armour & Co., Union Stock Yards, Chicago, Ill., engr. **Noted Feb. 25, C. D.—Feb. 27, E. N.-R.**

Neb., Omaha — POWER PLANT — Nebraska Power Co., Ralston St., plans constructing and equipping new power sub-station at 51st and Leavenworth Sts., $60,000; furnishing, installing new boiler to evaporate 30,000 gal. water per hr. into steam at 1,200 lb. pressure per sq.in.; purchasing and installing air conditioning with 150 ton refrigeration unit for shops and office building, $70,000. F. E. Smith, ch. engr.

N. Y., Brooklyn—FACTORY—Scandore Paper Box Co., 35 Steuben St., plans 3 story factory, Park Ave. and Steuben St., and reconditioning 5 story factory, 365 Park Ave. To exceed $50,000.

N. Y., Brooklyn—STORAGE, etc.—Borough Hall Chevrolet Co., 7724 Colonial Rd., plans by J. S. Kennedy, 157 Remsen St., altering storage, showroom and shop, 33 Debevoise Pl. $37,000 with equipment.

N. Y., Brooklyn—STORAGE, etc.—R. and J. Realty Corp., 182 Smith St., plans by A. Goldberg, 164 Montague St., altering heating, plumbing in storage and showrooms, 509 5th Ave. $37,000.

N. Y., Cold Spring — PLANT — Remington Screw & Bolt Co., Cold Spring, plans altering and reconditioning (West Point), foundry and plant. To exceed $40,000. Owner will use part of premises as plant and alter other portions and lease same for industrial use.

N. Y., Corning—PACKING and ASSEMBLY —Corning Glass Wks., Walnut St., soon lets contract constructing packing and assembling plant, Walnut St. $350,000. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

N. Y., Endicott—PLANT—Endicott Johnson Co., Endicott, making plans constructing plant addition. To exceed $37,000. M. A. Boigel, constr. engr. in charge.

N. Y., Fredonia — CANNING FACTORY — Farm King Packing Co., Inc., Union St., plans 1 story, part basement, 75x150 ft., steel canning factory, plain found., Union St. Private plans.

N. Y., Jamestown—SUPERSERVICE STATION—Socony Vacuum Oil Co., 1103 Elk St., Buffalo, and Crescent St., Jamestown, plans constructing super-service station, incl. 550 gal. steel tanks, electric pumps, air compressors, etc., South Main and Taylor Sts. $37,000 or more. **Maturity soon.**

N. Y., New York—GARAGE, etc.—Frederick Hussey Realty Corp., 233 West 35th St., plans by V. F. Pruitt, 342 Madison Ave., 3 story, brick, garage and showroom, plain found., 11th Ave. near 42nd St. $300,000.

N. Y., New York—TERMINAL, etc.—Baltimore & Ohio R.R. Co., H. A. Lane, ch. engr., Baltimore, Md., plans by J. DiStacio & M. P. Van Buren, 105 East 63rd St., 2 story, brick terminal, storage and office, 164 13th Ave. $50,000.

N. Y., Richmond Hill—STORAGE, etc.—D. Brown & Co., 5312 New Utrecht Ave., Brooklyn, plans constructing 1 story, brick storage and warehouse, 101st Ave. and 105th St. Est. about $40,000.

★ **N. Y., Rochester**—STEAM TURBINE GENERATING PLANT—Rochester Gas & Electric Co., H. Russel, pres. Gas & Electric Bldg., soon takes bids constructing steam generating plant, incl. bent tube type boilers, turbine tanks, heaters, air compressors, filters, and smoke elimination system. Platt St. $1,000,000. P.W.A. project. E. M. Gilbert, 512 Washington St., Reading, Pa. engr. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

N. Y., Syracuse—BOTTLING PLANT—Greenway Brewery, Inc., 1925 Park St., plans by W. Markam, Everson Bldg., constructing bottling plant for brewery addition, 1925 Park St.

N. Y., Victor—PLANT—Victor Food Corp., Victor, plans constructing plant addition, School St. J. Graham, Onondaga Hotel, Syracuse, engr.

N. C., Hatteras—ELECTRIC PLANT—Hatteras Development Co., Hatteras (incorporators are: J. I. Wilson, F. L. Peele, T. S. Eaton, all of Hatteras), granted application by State Utilities Comn. to build electric plant, Dare Co.

O., Cleveland—FACTORY—Union Towel Supply & Laundry Co., C. M. Roskoph, pres., 2321 East 34th St., soon lets contract 1 story, 100x105 ft., brick, steel factory addition. $40,000. Christian Schwarzenberg & Gaede Co., 1836 Euclid Ave., archts.

O., Elyria—MILL—Steel & Tubes Plant (subsidiary of Republic Steel Corp.) plans new mill for welding high carbon steel tubes. $85,000.

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†*Federal Government.*

Industrial Buildings (Continued)

Ore., Brooks—COLD STORAGE—Lebach Cold Storage Co., constructing 1 story, basement, 50x110 ft., frame cold storage, plain found. $60,000, incl. equipment.

Tex., Corpus Christi — PLANT — Mathis Cheese Co., Corpus Christi, plans by N. W. Hardy, engr. and archt., 1014 Nixon Bldg., 1 story, 50x125 ft. modern cheese plant.

Man., Winnipeg—ELEVATOR—Canada Malting Co. Ltd., making plans constructing addition to elevator. $100,000.

Ont., Hamilton—FACTORY—Gerlad T. Shipmen Paper Co., 32 Front St. W., Toronto, plans constructing 1 story, 50x440 ft. and 50x150 ft., brick, steel factory buildings. Est. $150,000 with special paper making equipment.

Que., Beauharnois—FACTORY—St. Laurence Alloys Ltd., R. Turnbull, pres., c/o Buckley & Harries, 36 Toronto St., Toronto, Ont., plans constructing new plant. $100,000.

Que., Montreal—MINING DEVELOPMENT—Gold Valley Mines Ltd., 341 Dominion Square Bldg., E. Dussault, mgr., plans extensive development program this spring.

Que., Montreal — PLANT — Metal Industries Corp., A. E. Laverty, secy., 414 St. James St. W., plans constructing plant.

Que., Noranda — POWER HOUSE — Noranda Mines Ltd., Royal Bank Bldg., Toronto, Ont., plans rein.-con. power house and 11 dwellings to be built in connection with power development. J. C. Meadowcroft, 1154 Beaver Hall Hill, Montreal, engr.

Que, Quebec City—PLANT—L. J. Paquin, 279 Grande Allu, representing Syndicate National du Combustible Inc., plans constructing plant. $40,000.

Que., Three Rivers—ABATTOIR—O. Laroche, 1026 St. Ursule St., plans abattoir, Notre Dame St.

BIDS ASKED

Mass., Brighton — WAREHOUSE — G. N. Meserve, archt., 260 Tremont St., Boston, taking bids 1 story, basement, 60x100 ft., brick, steel mercantile warehouse, concrete found., Soldiers Field Rd. and Everett St. extension, for R. A. Norris, c/o architect. $40,000.

Mass., Salem—GARAGE, etc.—Sale Fruit & Produce Co., 22 Front St., taking bids 1 story, basement, 67x131 ft., brick, structural steel, garage and warehouse, concrete found., Bridge St. To exceed $50,000. W. H. Hunt & Son, 6 St. Peter St., archt.

Miss., Vicksburg—FACTORY—Apr. 13, by Secretary Chamber of Commerce, Vicksburg, 3 story, brick, rein.-con., steel factory, plain concrete found., Washington St. and Madison St. $75,000. Krouse & Brasfield, Meridian, archts.

N. J., Bayonne—FACTORY—See "Contracts Awarded."

N. Y., Albany—WAREHOUSE—Apr. 6, by A. P. W. Paper Co., 1273 Broadway, general contract constructing 2 story, basement, 204x302 ft. warehouse, North Albany. To exceed $37,000. Johnson Wierk, Grand Central Terminal, New York, archts. Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

N. Y., Arcade—FACTORY—K. R. Wilson, 10 Lock St., taking bids general contract factory, $40,000. Private plans. Noted Feb. 27, C. D.—Mar. 5, E. N.-R.

N. Y., Buffalo—PLANT—Air Reduction Sales Co., 730 Grant St., taking bids plumbing and electrical work for plant addition, 730 Grant St. Noted Mar. 20, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

N. Y., Geneva—BOTTLING PLANT, etc.—Child & Koch, archts., 543 Exchange St., taking bids general contract plumbing, heating, electrical work for bottling plant and office, East North St., for Geneva Coco-Cola Bottling Corp., 82 State St. Est. exceeds $37,000. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

N. Y., New York—FACTORY—See "Contracts Awarded."

Pa., Bellefonte—LIME KILN—See "Contracts Awarded."

Wis., Wausau—FACTORY—Oppenhomer & Obel, archts., Wausau, taking bids 1 story, 40x260 ft., brick, steel factory, plain found., for Lake Wausau Granite Co., Wausau.

Ont., Hamilton—GARAGE, etc.—Hutton & Souter, archts., 36 James St. S., taking bids 2 story, 138x185 ft., brick, steel garage, showroom offices and alterations to present building, plain found., Bay and George Sts., for General Motors of Canada Ltd., Oshawa. $100,000-$125,000.

CONTRACTS AWARDED

Calif., Los Angeles—WAREHOUSE, etc.—Flower Realty Co. (United Parcels Service), 420 West 11th St., 3 story, 150x247 ft., rein.-con., commercial warehouse and garage, to P. J. Walker Co., 3900 Whiteside Ave., about $200,000. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

Calif., Richmond—STEAM POWER PLANT—Stone & Webster, general contractors, Russ Bldg., San Francisco, boiler for steam power plant, to Riley Stoker Corp., 408 South Spring St., Los Angeles, for Standard Oil Co. of California, 225 Bush St. Noted Oct. 8, C. D.—Oct. 10, E. N.-R., under "Contracts Awarded."

Calif., Stockton—MILL—Poultry Producers Assn. of Central California, 840 Battery St., San Francisco, 5 story, wood frame and galvanized iron elevator and barley rolling and corn cracking addition to mill, 40 ft. sq., to T. W. Williamson, P. O. Box 93, fixed fee basis.

Calif., Winters—PACKING PLANT—G. Petersen, general contractor, 1841 Bancroft Ave., San Leandro, sheet metal and plumbing for part 1 and 2 story, rein.-con. fruit packing plant, to J. Barth, Woodland, for Winters Dried Fruit Co., Winters•••electrical work, to Reliable Elevator Wks., Sacramento•••painting, to A. B. Bowen, Winters•••reinforcing steel, to Concrete Eng. Co., 1280 Indiana St., San Francisco. Noted Mar. 16, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

Del., Wilmington—POWER PLANT—Ludlow Mfg. Associates, Ludlow, Mass., general contract 1 story, 74x74 ft., brick, steel, concrete power plant, to Barclay White & Co., 22 North 36th St., Phila., Pa. Est. $37,000. Noted Mar. 20, C. D.—Mar. 26, E. N.-R.

Md., Lorelei—WAREHOUSE—Wright Distilling Co., Redwood and Lights Sts., 5 story, brick, frame rack warehouse, to Eng. Contg. Co., North and Lumden Aves., Baltimore. Est. $80,000. Private plans. Bids Mar. 18. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

Mass., Boston—FACTORY—Fred W. Baldan Co., W. J. Tarky, in charge, 5 Fulton Pl., altering and constructing 5 story, basement, 32x64 ft. sausage factory addition, South Market St., to B. R. Switzer Co., 39 Warren Ave., Charlestown. Worcester Tram Rail Co., 10 T Wharf, engrs.

Mass., Holyoke — BOILER PLANT IMPROVEMENTS — Holyoke Water Power Co., 1 Canal St., A. L. Nelson, engr., 31 St. James, awarded contract for fuel oil storage tank for 1 story, brick, steel boiler plant, to Chicago Bridge & Iron Wks., 250 Stuart St., Boston; valves and fittings, to Chapman Valve Mfg. Co., 71 A St., South Boston. Noted Jan. 27, C. D.—Jan. 30, E. N.-R., under "Waterworks, Contracts Awarded."

Mich., Detroit—FACTORY—Ainsworth Mfg. Co., 2200 Franklin St., 2 story, brick, rein.-con., steel factory buildings, for manufacturing automobile accessories and parts, plain found., to Bryant & Detwiler Co., 2806 Union Guardian Bldg. Est. $50,000. Albert Kahn, Inc., New Center Bldg., archts.

Mich., Lansing—PLANT—Olds Motor Works, Olds Ave., 3 story, 131x410 ft., brick, steel, rein.-con. automobile plant, plain found., Olds Ave., to H. G. Christman Lansing Co., Lansing. Est. $275,000. Bids Mar. 2 Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

Mich., Trenton—RACK WAREHOUSE—Trenton Valley Distillers, Trenton, 2 story, basement, brick, rein.-con. Warehouse 5, plain found., to Bennage & McKinstrie, 4612 Woodward Ave., Detroit. Est. $40,000. Noted Oct. 7, C. D.—Oct. 10, E. N.-R.

Minn., Minneapolis — GRAIN ELEVATOR — Bunge Elevator Co., W. J. Kellogg, vice pres., Chamber of Commerce Bldg., general contract grain elevator, near Como Ave. between 13th and 14th Aves. S.E., to H. M. Leighton Co., 716 South 7th St., about $400,000. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

Mo., St. Louis—TIN FOIL FACTORY—Johnston Tin Foil & Metal Co., 6008 South Bway., general contract 2 story, 102x117 ft. tin foil factory, Bway. and Bowen St., to J. E. Stauder, 5405 South Bway.•••heating, to E. P. Ambler, 939 LaSalle St.•••plumbing, to J. Sheehan Plumbing Co., 1609 Olive St.•••electrical work, to J. T. Finley, 5223 Tholozan St.•••elevator, to W. A. Miller Machine & Elevator Co., 920 North Main St.•••automatic sprinklers, to Grinnell Co., Inc., 1140 Central Industrial St. Noted Mar. 13, C. D.—Mar. 19, E. N.-R.

Mo., St. Louis — PLANT — St. Louis Independent Packing Co., 3815 Chouteau Ave., rein.-con., brick dressing and washing room addition to packing plant, 3815 Chouteau St., to A. H. Haeseler Building & Contg. Co., 2346 Palm St.

Mo., St. Louis — FACTORY — Fruin-Colnon Contg. Co., general contractors, 502 Merchants LaClede Bldg., structural steel for 3 story, basement, 61x210 ft., rein.-con., brick special products building, to Stupp Bros. Bridge & Iron Co., 3800 Weber Rd., for Monsanto Chemical Co., 1700 South 2nd St.; reinforcing steel, to LaClede Steel Co., Arcade Bldg. Noted Mar. 11, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

N. J., Bayonne—FACTORY—Morgon Corp., 233 Spring St., New York, factory alterations and repairs, Ave. A, near West 31st St., separate contracts. To exceed $40,000 with equipment.

N. J., Camden — FACTORY — T. F. Gibson, general contractor, Commercial Trust Bldg., Phila., Pa., 295 tons structural steel for new plant addition, for Campbell Soup Co., 2nd and Market Sts., Camden, to American Steel Eng. Co., 3520 Indian Queen St., Phila., Pa. Noted May 13, C. D.

N. J., Newark—BOTTLING PLANT—Coca Cola Bottling Co., 216 1st Ave., altering existing bottling plant, to D. G. Douglas, 605 Broad St.•••electrical work, to Buhl & Coffrey, Inc., 35 Hudson St.•••plumbing, to J. E. Joyce, 84 South 6th St.•••sprinkling system, to H. G. Vogel, 15 West 37th St., New York. Est. $50,000. Epple & Kahrs, 15 Washington St., archt.

N. Y., Buffalo—PLANT—Air Reduction Sales Co., 730 Grant St., heating for plant addition, to J. W. Danforth Co., 70 Ellicott St.•••[illegible] work, to Zimmerman Lumber Co., 307 Pine St.•••roofing, to J. A. Sanders, Inc., 107 Lathrop St. Noted Mar. 20, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded."

N. Y., Buffalo—BOILER HOUSE—Air Reduction Sales Co., 730 Grant St., constructing boiler house and garage, 730 Grant St., separate contracts; structural steel, to Buffalo Structural Steel Corp., 166 Dart St. Est. $45,000. Private plans. Noted Mar. 25, C. D.—Apr. 2, E. N.-R.

N. Y., Highland—FACTORY—Rathgeb Knitting Mills, Inc., Milton Ave., general contract factory addition, to L. T. Schoonmaker Construction Corp., 307 Lucas Ave., Kingston. Noted Feb. 27, C. D.—Mar. 6, E. N.-R.

N. Y., New York—FACTORY—Sailors Supply Harbor, 262 Greene St., altering 5 and 6 story factory, 755 Bway., separate contracts. $25,000. Private plans. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

N. Y., Niagara Falls—WAREHOUSE, etc.—Krueger Motor Sales Co., 835 Winslow Ave., painting warehouse, paint shop, to Frontier Painting Corp., 1223 Haeberle Ave. Noted Mar. 23, C. D.—Mar. 26, E. N.-R., under "Contracts Awarded"

N. C., Mount Holly—FACTORY—Southern Chemical Corp., J. L. Crist, pres., P. O. Box 1045, Charlotte, constructing large chemical manufacturing plant on Mecklenburg County Side of Catawba River, between tracks of P. and N. and Seaboard Railroads, own forces, $100,000. L. G. Atkins, Mt. Holly, supt. and engr.

O., Cleveland—FACTORY—Park Warehouse Co., c/o H. E. Rowe, archt., 13505 Garden Rd., 1 story, 60x260 ft. factory storage, Park Ave., to G. F. Ward, 5025 110th St. Est. $65,000. Awarded Mar. 26.

★ **Pa., Bellefonte** — LIME KILN—Chemical Lime Co., T. M. Brown, pres., constructing modern lime kiln and opening up new limestone mine on owner's property in Buffalo Run Valley, day labor and separate contracts. $500,000 loan from R.F.C. granted to make improvements. Private plans. Noted Mar. 16, C. D.—Mar. 19, E. N.-R.

Pa., Erie—PLANT—Lovell Mfg. Co., 13th and Holland Sts., constructing 2nd story addition to spring and casting plant, to H. Sheenk Co., Erie., est. $40,000 with equipment.

R. I., North Smithfield — PLANT — Branch River Wool Combing Co., Inc., North Smithfield, general contract 1 story, basement, 50x355 ft., brick wool combing plant addition, to Temple & Crane, Inc., 80 Federal St., Boston•••heating, to V. J. Kenneally Co., 251 Causeway St., Boston, Mass.•••electrical work, to Electric Maintenance & Eng. Wks., 193 Railroad St., Woonsocket•••sprinklers, to Grinnell Co., Inc., 260 West Exchange St., Providence•••roofing, to O. P. French & Sons, 42 Dexter St., Woonsocket•••skylights, to E. Van Noorden Co., 100 Magazine St., Roxbury, Mass.•••structural steel, to New England Structural Co., Everett, Mass.•••excavating, to Home Coal Co., 256 Privilege St., Woonsocket. Est. about $100,000 with equipment. Noted Mar. 17, C. D.—Mar. 19, E. N.-R.

Tex., Houston—PLANT—Morton C. Tuttle Co., general contractors, 31 St. James St., Boston, Mass., furnishing 2,000 tons structural steel for pulp and fibre plant at Pasadena, suburb of Houston, to Ingalls Iron Co., 720 4th Ave. South, Birmingham, Ala., for Champion Paper & Fibre Co., Canton, N. C. J. E. Sirrine & Co., Greenville, S. C., engrs and archts. Noted Mar. 10, C. D.—Mar. 12, E. N.-R., under "Contracts Awarded."

Tex., Houston—RESEARCH LABORATORY—Shell Petroleum Co., c/o A. T. Scovill Co., archts., general contract 1 story, 50x160 ft., brick, steel, stone and glass geo-physical research laboratory, Bellaire Blvd. at Edloe St., to P. E. Eller, 1st Natl. Bank Bldg., about Shell Bldg., $70,000•••reinforcing and structural steel, to Mosher Steel Co., Box 338•••steel sash, to Truscon Steel Co., M and M Bldg.•••electric wiring, to Jacobs Bros., 1014 Prairie Ave.•••plumbing and air conditioning, to Robischung-Kiesling, 4848 Main St.•••fence, to Cyclone Fence Co., 2nd Natl. Bank Bldg.•••glass brick, to Detering Co., Washington Ave.•••painting, to J. W. Beunhausen, on site•••cork, to A. C. Horn, 2120 Polk Ave.•••aluminum, to A. J. Bayer, 1112 Wood St.•••Thermax Deck, to S. W. Greer, M and M Bldg.•••roofing and sheet metal, to Acme Roofing & Supply Co.•••lath and plaster, to H. F. Green, 3518 Jensen Dr.•••glass, to Binswanger Glass Co., 207 North Main St.•••floors, to Maurice Angly Lumber Co., 2nd Natl. Bank Bldg.•••tile, to Mazza Tile Shop, 1915 Dallas St. Total est. $125,000.

Wis., Milwaukee—BREWERY—Miller Brewing Co., brewery extensions for beer canning, separate contracts awarded•••can making equipment, to American Can Co., 230 Park Ave., New York•••other equipment contracts, to G. J. Meyer Mfg. Co., Cudahy, to Yundt Co., Waukesha, and to Alvery Conveyor Co., 3201 South Bway., St. Louis, Mo. Est. $40,000.

Que., Rouyn—MILL—Stadacona Rouyn-Mines Ltd., Rouyn and Montreal, constructing new mining mill, 7 mi. from here, to E. J. Grant & Kennedy, Haileybury, Ont. Est. $100,000. Sub-contract for necessary buildings, to Hill-Clark-Francis, New Liskeard, Ont.

†*Federal Government.*

For official proposal advertising see Searchlight Section

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